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MOORE'S SCREW MACHINE.

Improvement in Screw Machines.

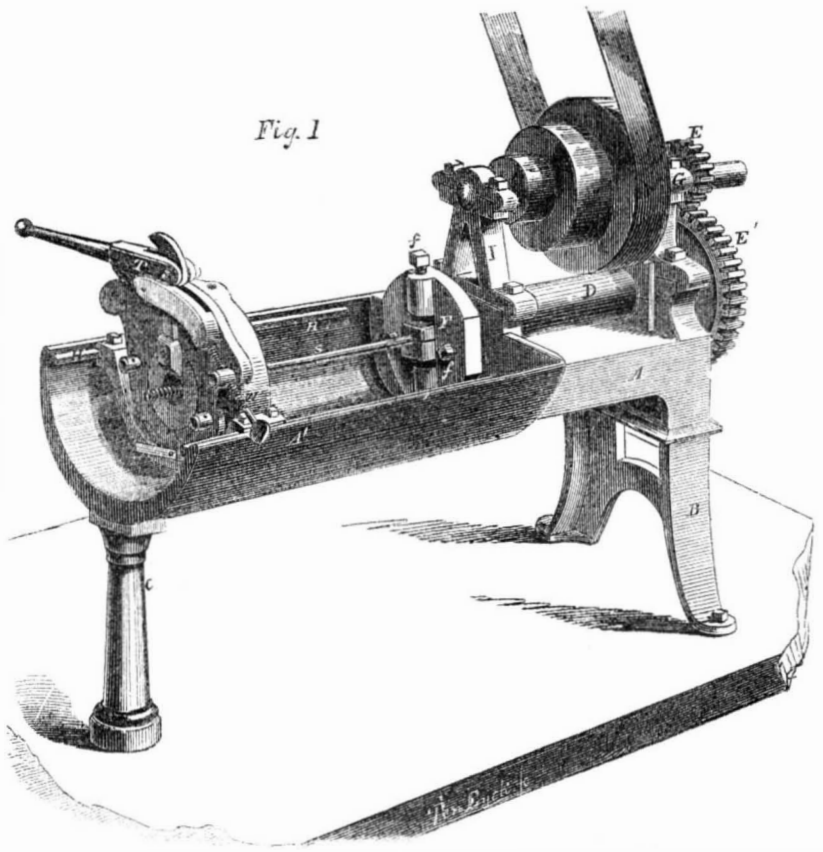
The annexed engravings represent a machine for cutting screws, which has been used with great success for three years in some of the large shops in the West. The shaft of the head stock is hollow, to allow the insertion of bolts of any desired length, and in all its equipments it is equal to any of the screw-cutting engines in common use, while by the peculiarity to be described it admits of a very nice adjustment of the screw produced, cuts the thread complete, at one operation and in a very superior manner, and affords extraordinary facilities for inserting and removing the bolt.

The novelty lies in the arrangement and mode of operating the cutters and dies. Fig. 1 represents the machine complete, fig. 2 an enlarged end view of the cutting portion alone, fig. 3 a piece fitted to the face of fig. 2, and fig. 4 a portion of the form produced. The threads are in no instance *raised* on the bolt by crushing the metal, but in every case the crease is *cut* out clean by the dies, the forward edges of which act as cutters, like the tool of a lathe, and remove the metal in thin shavings. No backing motion is ever required, and consequently one belt and one pulley for reverse motion is dispensed with, and the dies are never liable to nip and heat.

The bed-piece, A, the legs or standard, B, and the front pillar, C, explain themselves; so also do the standards or carriers, I I, which support the journals of the hollow mandrel, D, with the cone pulleys, gearing, etc, to give motion thereto. On the front end of D is fixed the ordinary chuck, F, which contains the pair of ordinary holding dies, *f*. The bolt to be operated on is represented by S, which is held in the dies, *f*, and consequently receives the same rotary motion as D.

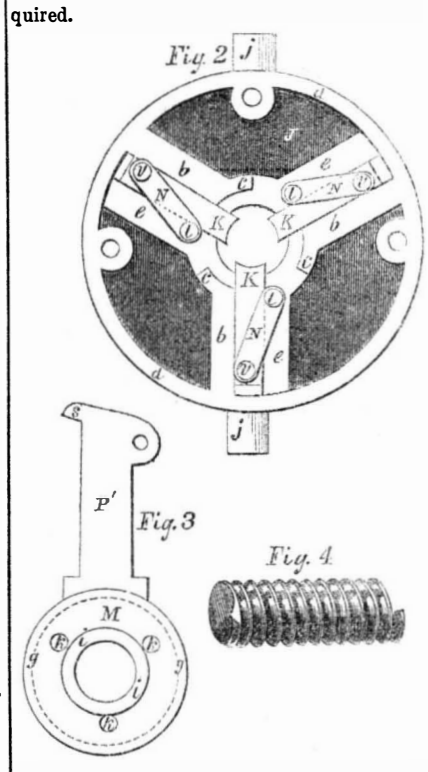
On the interior surface of the bed-piece are cast straight horizontal slides or guides, H H, to which is fitted the sliding carriage W, as represented, and in this is supported the die chuck with its attachments. The principal portion of the die chuck consists of a circular metal box, J, of which fig. 2 is a front or interior view. It is provided with journals, *j j*, by which it is supported in a ring, (not represented) so that it is free to oscillate in a horizontal plane, and this ring is in its turn mounted on journals located horizontally to allow of oscillation in a vertical place, the effect of the whole being to suspend the box, J, by a kind of gymbal ring or what is equivalent to a universal joint, so that it is free to accommodate itself to any position of the sliding carriage, W.

The interior of the box, J, contains three radial grooves, into which the cutting dies, K, are fitted to slide freely. The dies are connected by links, N, to pins, *k*, on another ring, M, which latter is fitted loosely to the front of J, so that it may be partially rotated by the aid of the arm, P', and thus draw together or separate the cutting dies, K, at pleasure. The plate, M, has an opening in its center large enough for the largest sized bolt to pass freely through, and the projecting rim or lip, *i*, fits accurately against the faces of the dies, K, so as to confine them in their grooves without



preventing their proper and easy motion. All the parts are so rebated and confined as to make a strong and durable job.

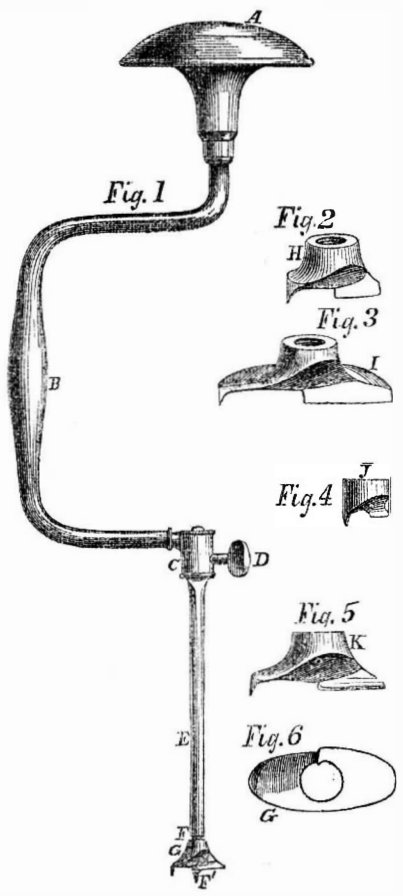
The ultimate means for controlling the position of the ring, M, and of graduating the sizes of the screws cut now remains to be explained. The handle or lever, T, is jointed to the arm P', at its extremity, and must be drawn forward, to bring the dies, K, into action. When drawn sufficiently forward, a hook or catch drops over the end of a curved stop, as indicated in fig. 1, and confines it until released by the attendant. The position of this curved stop may be adjusted at pleasure, and thus the whole machine is made readily adjustable to all the conditions required.



Screws are cut by this machine with great rapidity, and the thread being never of greater size than the plain part, bolts can always be fitted into work perfectly tight, a point of great importance in car or agricultural machine making, bridge building, etc. It is also claimed that valve rods, or other nicely fitting parts of machinery, first turned in a lathe and then cut in this machine, will be found perfectly straight, however unequal may be the hardness of the different parts of the metal.

This machine was patented by Mr. John Moore, of Madison, Ind., in October last. One of the machines is now on exhibition at Lovejoy's Hotel, this city. Any further information may be obtained by addressing Joseph Garratt, Sen., & Charles Almond, care of John M. Slaney, Baltimore, Md., or George Almond, Madison, Ind.

Adjustable Bit.



The accompanying cuts represent a new tool for boring holes of various sizes, the invention of Mr. Charles H. Barnes, of this city.

The peculiar properties of these adjustable bits are boring a smooth hole, cutting very easy, capable of being used in a brace or handle at the pleasure of the operator, will pack in less space, and are cheaper than any other bits and gimlets boring the same sizes.

As will be seen by the cuts, a different cutter, G H I J K, etc., is provided for each size of hole to be bored, and in each instance the sharp screw point, F', of the spindle, E, projects through the cutter at its center, thereby fastening the cutter to the spindle, while the screw of the spindle projecting beyond, acts as a feed screw, like the center of an auger bit.

A set consists of 12 cutters, 2 spindles, 1 handle, wrench and screw-driver, cutting 12 sizes, from 1-4 to 1 inch inclusive. Eight of the cutters, viz., from 1-2 inch upwards, increased by sixteenths, are formed to fit on a larger and longer spindle. The remaining four cutters (1-4, 5-16, 3-8, and 7-16,) are similarly adjusted on the small spindle.—Either spindle can be quickly fastened to the handle, when either of the above cutters, from 1-4 to 1 inch, can be used easily in the form of a gimlet, and by turning one screw the handle is disengaged, when all may be used in a brace.

Any further information concerning this invention may be obtained of Mr. D. B. Logan No. 11 Gold st., this city. A patent has been applied for.

Migration of Plants.

"Plants are seldom motionless. The wind wafts the seed of the dandelion. The waves bear the nut of the cocoa palm. Man has carried the apple and pear, the apricot and the peach, from the highlands of Asia to the Far West. The cerealia have spread over all the world, and have become so cosmopolite that the land of their birth is unknown. Some plants would almost seem to attach themselves to particular races. The common plantain is called by the North American Indians the White Man's Footstep.' Currents of air carry seeds and the eggs of insects and infusoria. To settle this formerly disputed question, a German philosopher, Unger, placed several plates of glass, carefully cleaned, between the almost air-tight double sashes with which he protected his study against the rigors of a fierce northern climate. Six months later he took them out, and examined the dust that had fallen on them, through imperceptible cracks and crevices, with a microscope. The result was that he discovered in the apparently inorganic dust the pollen of eight distinct plants, the seeds of eleven varieties of fungus, the eggs of four higher infusoria, and living individuals of at least one genus."

Observations like this go far to disprove the evidences of new created life which are often discovered both in natural and artificial compositions. It seems sometimes almost impossible to imagine how eggs or seeds could have either found admittance or retained vitality under circumstances where life appears, and it has not been deemed inconsistent with revelation to suppose the work of creation still going on. But such instances as above recorded induce a great reluctance to believe in newly originated life, and to induce a belief that the varieties of animals and plants which appear at intervals are but modifications generated from pre-existing species.

Paddle Wheel Experiments.

One of the large towboats plying about our harbor has wheels with pointed paddles, or rather with paddles so arranged as to produce the same effects, and covered by wheel-houses of such form as would only allow of paddles so arranged. It has been claimed that her performance is decidedly better than with the old wheels.

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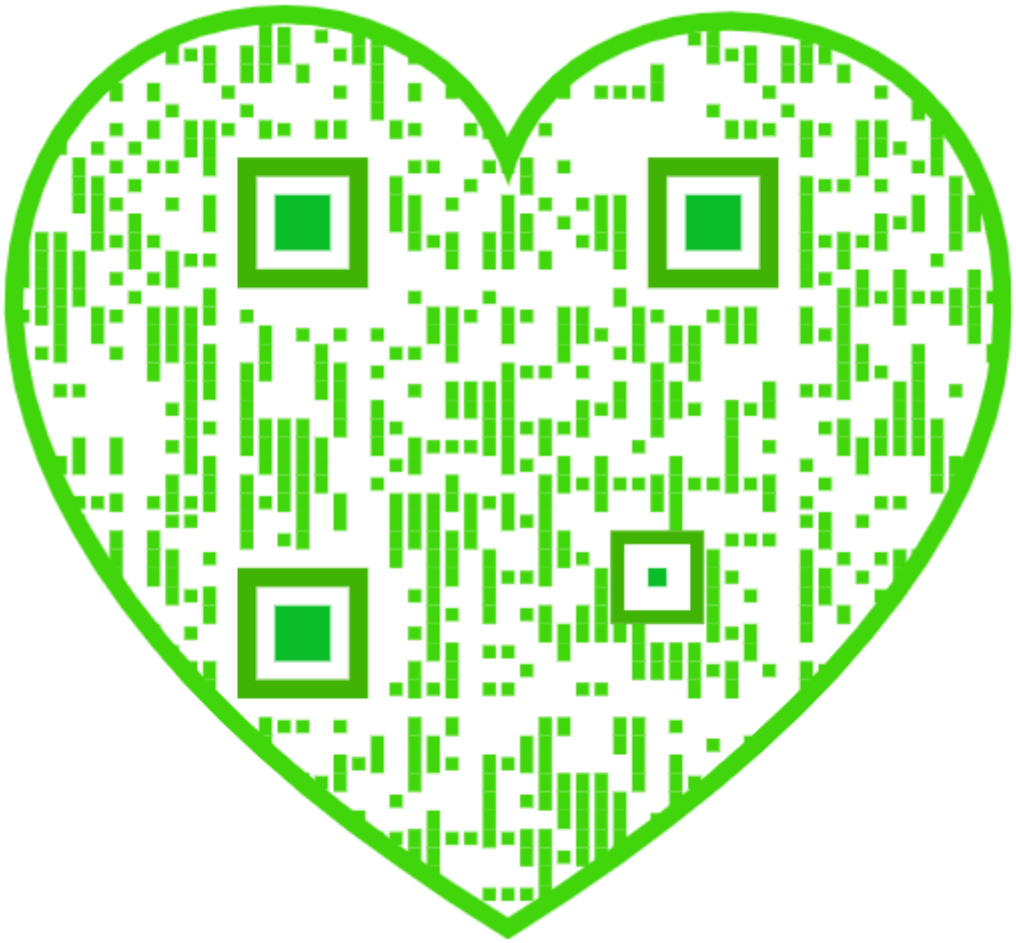

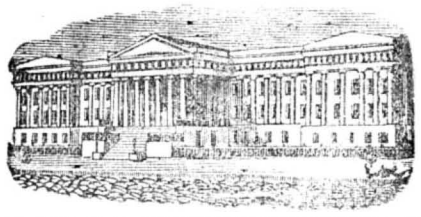

[Reported officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING MARCH 3, 1857.

FRICTION ROLLERS IN SHIP'S BLOCKS—John Allender, of New London, Conn.: I claim the pieces, F F, placed between the rollers, in combination with the flanges, or their equivalents, to hold the rollers in position end-wise, substantially as described, and permit them to revolve, thereby dispensing with the pivots and rings heretofore used for that purpose.

PLATES FOR ARTIFICIAL TEETH—A. A. Blandy, of Baltimore, Md.: I claim molding the plates of artificial teeth in such manner as to obtain a perfect fit to the gums, and a correct articulation of the teeth upon casting as set forth.

SHUTTLE DRIVERS—Saml. Boorn, of Lowell, Mass: I claim the described composition, to be used in the manufacture of the striker of a shuttle driver, as described

SEWING MACHINES—C. D. Belcher, of Charleston, S. C.: I claim the improvement on the patents of A. B. Wilson described, consisting in the application of an unyielding brake, to hold the loop upon the revolving hook, and imparting a positive movement thereto, in such a manner as to separate it from and bring it to the periphery of the hook at the proper moment, substantially as specified.

PEN AND PENCIL HOLDER—G. H. Byron, of Governor's Island, N. Y.: I do not claim the diagonal frames nor the holders.

I claim the attachment of the handles of the holders to a diagonal expanding frame and the general arrangement.

I also claim the handle, A, and the arms, d, working by pins in slots, in the attached holders, and secured by thumb screws to the handle, A.

Neither do I limit myself to any number of holders, which may consist of any required number

I also claim its application by attaching pens, known as "music pens," instead of the ordinary writing pens for ruling several staves of music at one operation.

HAND STAMP—Leonard Bailey, of Winchester, Mass.: I claim arranging an ink fountain and its discharging roller at the foot of the slider and between the same and the type or printing plate, and so as to be movable therewith, substantially as set forth.

I also claim arranging the forked lever, L, of the inking roller, with respect to the slider, C, substantially as described, so that while the palm of a person's hand is placed on the top of the slider one or more of the fingers can operate said lever, or the upper arm thereof, in a manner to move the inking roller backward against the type, and into a position to come in contact wsth the fountain roller, when the slider is next depressed.

SEWING MACHINES—Joseph W. Burnham, of Hartford, Conn.: I claim the employment on sewing machines of the mechanism herein before described, so as to cut or clip the thread on the under side of the work.

TRIP HAMMERS—Henry Bushnell, of New Haven, Conn.: I claim the use of the male and female, V, wheels, having as specified a portion of the surface of either one of them removed, so as to permit the hammer to drop freely when arranged, substantially in the manner and for the purposes set forth,

WASHING MACHINES—Richd. Collins, of Chicopee, Mass.: I claim combining with and arranging in the vibratory dasher, as described, one or more soap receptacles or chambers, each provided with an aperture of discharge and a stop cock or faucet, or the equivalent therefor, disposed substantially in manner, and so as to operate as specified.

LUBRICATING FIRE ARMS—Samuel Colt, of Hartford, Conn.: I claim the method of applying oil or other lubricating matter to the outer surface of the ball, or as the equivalent, to the bore in close proximity with the ball, after the ball has been inserted by means of an instrument having a reservoir of liquid lubricating matter in combination with a valve or other equivalent means for discharging the required quantity of lubricating matter, substantially as described and for the purpose set forth.

CHURNS—E. P. Cowles and J. A. Cowles, of Oakfield, N. Y.: We distinctly disclaim the invention of two dashers, moving in contrary directions and operated by geared wheels and an intermediate pinion. Examples of such an arrangement are seen in Brown and Bigelow's patent, 1852, and in Mansfield and Moore's rejected application, 1853; but in neither of these examples, nor in any other churn with which we are acquainted, is our feature seen, of having the arms of the dashers so curved as to draw the cream from the center of the churn, and force it against the sides of the machine for the purposes set forth

We disclaim the use of curved arms, except when thus employed and operating.

Having the connecting pinion, F, adjustable, in the manner and for the purposes described, is also a new and highly valuable feature in this description of churn. Without this adjustability it would be almost impossible to collect the butter.

The employment of springs, g, and, i, saves the necessity of stuffing boxes to prevent leakage. These features are also new in churns to the best of our knowledge and belief.

We disclaim every part and feature of our device which is seen in any other churn or analogous machine, but we claim and desire to secure by letters patent the shafts, B C, with collars, f, h, and wheels, D and H, thereon, in combination with springs, i and g, arranged and operating in the manner and for the purposes set forth.

[If report be true this churn will bring the butter in a wonderfully short time, and also extract more of it from a given quantity of cream. Double dashers are employed whose arms are of peculiar shape, whereby the cream receives an unusually thorough beating. After the butter has "come," it is easily collected by disengaging a pinion, and allowing both dashers to turn in the same direction.]

HAND PRINTING PRESS.—N. L. Chamberlin, of West Roxbury, Mass.: I claim, first, the method described, of hanging and balancing the impression roll, for the purpose set forth.

Second, the method substantially as set forth, of adjusting the impression roll to increase or diminish the pressure given, and adapt it to the size of the form and the hight of the type or block.

CUTTING PASTEBOARD FOR BOXES—E. E. Clarke, of New Haven, Conn.: I claim the method of attaching and adjusting the cutters in combination with the main cylinder, when the whole is constructed, arranged, and made to operate substantially as described.

Second, the combination of the spring clamp, M, with the main cylinder and cutters, when constructed and made to operate substantially as described.

SHEEP SHEARS—E. G. Chambers, of Bucyrus, O.: I claim the fixed plate stock, C, as described, combined with the bifurcated handle of the vibrating cutters, substantially as and for the purposes specified.

HARVESTERS—S. A. Clemens, of Rockford, Ill.: I claim the method of operating the sickles of harvesters by means of a catch wheel, a spring, and a recoil cushion connected, combined and attached substantially as described.

POTATO DIGGERS—Paul Dennis, of Stillwater, N. Y. I claim, in combination with the digger, A, in the manner described and shown, constructing the separator, so as to form an irregular undulating surface for the potatoes to fall upon, for the purpose set forth.

[The stops or elevations of the seperator are arranged out of line with each other, so that the irregular undulating surface may effectually break up the dirt surrounding the murphys, and prevent its passing off readily from the separator. The latter runs directly upon the ground behind the digger, and by turning upon a shaft at the forward end, adjusts itself to the different depths to which the digger may be caused to enter the soil, or to rise in passing over obstacles. After the potatoes come upon the separator they roll some distance along a plane portion where the dirt is stripped off and left adhering to the ground beneath, and by the time the potatoes are carried over the irregular stops, and a terminal plane portion, they are pretty thoroughly cleaned.]

SUSPENDING WIND WHEELS—Joseph de Sendzimir, of South Oyster Bay, N. Y.: I do not claim the regulation of the sails by weights, levers, and cranks. Nor the use of brakes for stopping the wind wheel. Nor communicating power by pulleys, bands, cones, &c. Neither do I claim any part or feature of the machine described, which is seen in any other windmill.

But to the best of my knowledge it is new to suspend the wind wheel within a revolving frame, in the manner and for the purposes already described.

I claim suspending the wind wheel, A, within a revolving frame, b c, in the manner and for the purposes substantially as set forth.

[The wind wheel in the above improvement is of the ordinary vertical kind; but it is placed within a frame which is pivoted at the top and bottom. The arrangements for supporting the frame are cheap and simple. The wheel is placed in the center of its shaft; it therefore runs easier than when placed at the extreme end, as in common windmills. The sails are rendered self adjusting, and the wheel may be so set as to run at a given speed, although the wind may fluctuate considerably The general construction of this wheel is such that it can be made by any farmer or an ordinary mechanic. No castings are required. It is a good invention.]

MAKING TIRE FOR CAR WHEELS—John Evans, of Portsmouth, O.: I claim the use of the rings, A A, in connection with the segments of iron as herein described, the same being cut and piled and prepared for forging in the manner set forth, for making tire for railroad car wheels locomotives and other purposes.

CIRCULAR SAWING MILL—Philander Eggleston, of Mobile, Ala.: I do not claim separately the means employed for feeding the log to the saws and gigging back, for that is a well known device and in common use.

But I claim, first, suspending the log, P, to the carriages, E F, by means of the bars, n, and, x, arranged substantially as shown with the screw rods, z, q, and shafts, u, whereby the log may be firmly dogged or secured in proper position, and also adjusted or elevated or depressed to the desired position or hight.

Second, I claim suspending the log, P, from the carriages, E F, as shown in any proper manner, in combination with the two saws, E E, arranged as shown, and the feed movement composed of the shafts, I J L, with their respective pulleys and belts, and the clutch operating as described.

[This invention provides for the employment of two circular saws, the arbors of which are mounted in sliding frames, so that the saws may be set to the log instead of the log to the saws, and that the saws may work on opposite sides of the log. By having the carriage placed at the upper part of the framing, and the log firmly and conveniently suspended therefrom, a free space is left on the flooring for the attendants, and a less number is consequently required.]

MACHINES FOR HARVESTING CORN—J. H. Frampton, of Hopewell, O: I claim the body, H, so arranged that it may be operated to discharge the stalks, as described, in combination with the rods, O O, placed in said body and provided with curved ends or griping arms, p p, as shown for the purpose specified.

CHRONOMETER ESCAPEMENTS—James Fulton, of Louisville, Ky.: I claim the combination of two levers in such a way that one spring may perform the offices above described by acting on both of them.

BRIDGE TRUSSES—Albert Fink, of Parkersburg, Va: I do not confine myself to the particular form of the shoe casting, d, or the mode of connecting the suspension rod with the same. This may be varied according to circumstances to carry out the object in view, viz., the support of either the upper or lower chord of truss.

I do not claim the general arrangement of the parts, b, b, c, c, a a, or any of the details of their connection with each other; but what I do claim is the use of an auxiliary truss which is to consist of the lower part, c, of the counterbrace, c c, and of a piece, c, placed between the two main braces, b b, independent of these braces substantially as herein set forth.

HARVESTERS—Lewis W. Harris, of Waterville, N. Y.: Having thus fully described the nature of my invention, I would state that I am aware two rock shafts with segmental wheels and pellets have been worked from a crown wheel, and to one of which shafts the pitman was connected to vibrate the cutters, this I do not claim; but what I do claim is, first, in combination with the alternately projecting lugs, a, b, the rocking shafts, L L, with their toe-pieces, cranks and connecting rod, N, for the purpose of operating the cutters, as set forth.

I also claim hanging the shafts, L L, in the hinge pieces K K, when said hinge pieces are put within the control of the conductor, by means of the rods, h, h, and treadle, or their equivalents, so that he may from his seat throw the cutters into and out of gear, as herein set forth and explained.

HAND STAMP—Horace Holt, of Winchester, Mass.: I do not claim operating the platen or stem and the inking roll by a simple operation of the hand; but I claim the combination of a detached lever, with its toe-pieces for inking and taking the impression, when said inking and impressing devices are returned to their places by springs as set forth.

[This invention works the platen by a cam, which may be worked in any ordinary manner so as to serve as a hand stamp or a foot press, or may be worked by power, as preferred. As a power press, it is designed principally for card printing. It appears a simple and very effective device.]

SCREW WRENCH—B. F. Joslyn, of Worcester, Mass.: I claim a hammer shank, with a thread on both edges, fitting into a nut, when combined with the other parts of the wrench, arranged as shown and described.

[The shank of the lower and stationary jaw is made hollow, so as to receive the bar of the sliding jaw, and also to receive a screw which is fitted within the hollow shank, by the side of the bar of the sliding jaw, and passes through a projection on the side of the same, so as to protect the threads from dust or injury.]

WEAVER'S SHUTTLES—Lucius J. Knowles, of Warren, Mass.: I am aware that a stop-motion or mechanism has been applied to a shuttle and race beam of the lay of a loom, and so as to operate in such manner in case of the breakage of the filling thread of the bobbin of the shuttle as to stop the motion of the shuttle or arrest it in the race beam before it could enter the shuttle box next to that part of the said stop-motion which was affixed to the race beam. In this kind of stop-motion the shuttle in being arrested in its motion across the race is liable to be driven by the reed close into the crossing of the warps. In case such should take place, injury to the warps or loom may ensue. My stop-motion is of an entirely different kind, as it allows the shuttle to enter each shuttle box, and when once in either box, the loom will be stopped in case the filling thread may have been broken during the passage of the shuttle across the race beam, and into such box.

I claim the combination of the tilting lever, F, the inclined wires, G G, or the equivalent of the latter, and a spring cam, C, or means essentially the same as said spring cam, whereby, in case of breakage of the thread from the shuttle while the latter is in motion across the race beam of the lay, the cam or contrivance to operate the protector may be caused to so act with or against such protector, or its equivalent, that it shall be made to produce stoppage of loom, as stated.

RAKER FOR REAPING MACHINES—Caleb Lee, of Knox Township, O.: I claim the two spring latches, l l, working upon the arm, k, in combination with the pointed lever, g, the latches being notched to receive the same, and both the lever and latches being arranged so as to be acted upon alternately by pins, p p, to raise or lower the rake and hold it in either position as required, all in the manner and for the purpose set forth.

BASIN COCK—Robert Leitch, of Baltimore, Md.: I claim the arrangement of the loose stop piece, c, constructed with a male screw thread on the periphery, and the means for operating it vertically without turning, by the fixed square, F, on the stem, A, and a corresponding female screw thread, or its equivalent, in the rotating globe of the cock, B, substantially as and for the purpose set forth.

CORN HUSKER—Wm. Lewis, of Seneca Falls, N. Y.: I would remark that the connection of the hammer, G, to the rod, F, to the plate or spring, b, is not strictly essential. In practice, or in an operating machine, the hammer may be rigidly attached to the rod, F, but probably the elastic or spring connection is preferable. I do not confine myself, however, to either mode of attachment.

I claim the bar, D, knife, B, bar or hammer, G, and stop, E, in combination with the clearing rod, Q, when the whole are arranged to operate conjointly as shown, for the purpose specified.

[A stationary knife with a concave edge is employed to cut off the nubbin or butt of the ear, a bar presses down on the same, and the ear is then disdharged from the husks by the action of the hammer. The clearing rod rids the knife of the nubbin, should it incline to adhere, and the action of the whole is exceedingly rapid, and not liable to choke, like many huskers.]

PHOTOGRHPAIC PLATE HOLDER—Wm. and Wm. H. Lewis, of New York City: We do not claim a sliding jaw in itself; neither do we claim adapting said sliding jaw to different sizes of glasses or holders by stops or notches taking said moving jaw.

Neither do we claim retaining articles between the jaws by power derived from a spring.

Neither do we claim turning the vise or holder upon its base into any desired position, as this has before been accomplished by a screw connecting the base and vise.

But we claim, first, constructing the hollow base, a, and hub, c, of the cap plate, b, in such a manner as to receive the friction spring, d, screw, f, and cap, e, for regulating the power with which said plates are clamped together, substantially as and for the purpose specified

Second, we claim regulating the force with which the spring, p, tends to clamp any glass or holder between the jaws, l and n, by means of the set screw, o, acting substantially as and for the purpose specified.

Third, we claim the beveled adjustable bars, m, on the jaws, l and n, to support the glasses, plates, or holders, with their upper surface at the desired hight above the upper edges of the said jaws, substantially as and for the purposes specified.

MASTIC ROOFING COMPOUNDS—C. R. Milks, of Detroit, Mich.: I am aware that most, if not all of the articles named have been used in like compositions; and I am also aware that in some roof compositions heat has been applied to the articles separately, just before they have been put upon the roof.

I claim the composition for roofing made up of the ingredients, in the proportions and in the manner set forth.

HUSKING CORN—John Massey, of Buffalo, N. Y.: I do not wish to limit myself to the particular proportions set forth, but desire to include only such forms and proportions as substantially embrace the principle of my invention.

I claim the tapering tubular burr, B, for the purpose of removing the husks from the corn, when arranged and operating substantially as set forth.

CURTAIN ROLLERS—Purches Miles, of Hartford, Conn.: I do not claim as new the toothed flanged pulley, nor the endless eyelet band, nor the friction spring, nor the roller curtain by themselves, nor any two or three of these in combination.

But I claim the combination of the toothed flanged pulley, A, the endless eyelet band, B, and the friction spring, C, with the roller curtain, in the manner and for the purpose substantially as set forth and described.

SHINGLE MACHINE—H. D. McGeorge, of Morgantown, Va.: I claim in combination with the saw and carriage the rocking bed, F, for determining and adjusting the bolt to the thickness and taper of the shingle to be sawed, substantially as set forth.

COMPOSING TYPES—Wm. H. Mitchel, of Brooklyn, N. Y.; I claim the manner of dropping one type at a time from the lines of types in the conductors, g, by the combined operation of the pushers, 52, stop, 55, and fingers, 56, substantially as and for the purposes specified.

I also claim inclining the composing wheel, when used in connection with the inclined chute or conductor, 59, and fence, 60, on the lower side only of the inclined composing wheel, for the purposes and substantially as specified.

I also claim the compositor's grab, 65, formed in the curved shape, and used in the manner and for the purposes specified.

[NOTE—The above includes only about half the claims of patents issued; but the late hour of their reception, due, probably, to the confusion attending the ceremonies and festivities of the Inauguration, compels the postponement of the remainder until our next issue.]

Superheated Steam.

The advantages of using steam extra heated after its separation from the water have been much discussed, and although the general opinion of philosophers and savans is adverse to its employment in any form, it is notorious that the Wethered system tried in this city on the steamer *Joseph Johnson*, and to a small extent on the *Arctic*—although the pipes could not be made to endure well—was very economical in the use of the steam, or what is the same thing, the amount of power obtained from the consumption of a given amount of fuel was very considerably increased. Wethered's system consists in taking the steam from the boiler through two pipes instead of one, and while one pipe partly throttled is led direct to the engine, the other is led in bends through the flues or through the furnace so that its contents become very highly heated. The steam admitted to the cylinder is consequently a mixture of common steam, with superheated steam, and although it is difficult to see how this mixture differs from steam only slightly superheated, the economic effect of the system proved so much superior to that of common steam that Mr. Collins was induced to expend some thousands of dollars in minor experiments, and subsequently to apply it on the mammoth *Arctic*. The experiment failed, but not from want of merit in the fundamental principle, and it is therefore important to understand, if possible, exactly how far and *how* superheating is advantageous, if at all, as the practical difficulties may possibly he surmounted by patience and ingenuity, if there be sufficient inducement.

Thomas Howard, a recent writer on the subject avers a quite sensible gain in effect from superheating steam to a moderate degree, and expresses in the following very clear manner what is probably the correct theory thereof. He enunciates it as new, which is not the fact, but he has expressed it better than any previous author:—

"Since the time of Mr. Watt's champion improvement in the steam engine, by condensation in a vessel separate from the cylinder, it has been assumed that nothing more remained to be examined or developed in this regard. Let us see if there may not be one hidden agency that perchance has escaped even the lynx eye of that scrutinizing artisan, and the apprehension of other experimentalists and engineers. Let us go the cylinder and condenser as left by him, and in practical operation. On the plenum side of the piston we have water-saturated steam pressing forward from the boiler at a temperature due only to its density, and bringing with it a quantity of uncombined water also, every smallest diminution of temperature causing an immediate deposit of water within the cylinder. When the stroke of the piston has been made, and a free passage is opened to the condenser, this water boils rapidly off imbibing the great latent heat due to a rare vapor under the existing vacuum, kept up too by the large exhaust pump; and if a new supply of steam did not presently follow, the cylinder and adjuncts would rapidly fall to about 80° Fahr. But by continued action, a compromise is brought about, under which the steam is always acting in the cylinder causing a very great deterioration of effect and loss of heat. But by giving to the steam a sufficient surcharge of caloric to enable it to maintain its elastic or vaporous condition, throughout the stroke without the deposit of water, such effect cannot, of course, take place, but only a refrigeration that would arise by the discharge of so much heated air. The same holds, but greatly moderated, in high pressure engines.

Important Improvement in Printing Presses.

We had the pleasure, last week, of witnessing a preliminary experiment, with a full-sized model, of an apparatus for turning the sheet and printing it upon the second side before it leaves the press. The apparatus, which is simple and clearly practicable, is attached to one of Hoe's celebrated "Lightning Printing Presses," used in *The Sun* establishment. It is the invention of Moses S. Beach, Esq., the Editor and Proprietor of *The Sun*, by whom it has been patented in Europe, as well as in this country.

In its operation there is no checking or reversing the ordinary movements of the press. A double or twin set of fingers, which shut against each other, are so arranged as to grasp the back or tail end of the sheet before it leaves the printing cylinder, and after the first impression is taken. The sheet, thus held fast while the cylinder continues to revolve, is drawn in again for the second impression, and thus the feeding the sheet by hand the second time, or fifty per cent. of the labor now required is saved, and, practically, the sheet is printed on both sides at once—two forms instead of one being placed upon the press.

Nor, it seems to us, does the improvement end here. The difficulty of feeding the sheets in the first place, by machinery, is not insurmountable. It can be done by cutting them from a roll, if in no other way, and then the feeding would necessarily be more accurate than it can be by hand. Spoiled sheets from irregular feeding, as well as "packets," would be almost unknown; the full speed which the press is capable of could be maintained, and uniform "register" and uniform work would be the rule. Thus, too, folding and counting machines, which are now comparatively useless, might be brought into service.

Unless we are greatly mistaken, this invention will make a stir among the newspaper folks. We regard it as a most important and valuable improvement, and congratulate our editorial brother upon its production, while, at the same time, we welcome him to the ranks of American Inventors.

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How to use Steam in Engines.

In our last number we presented a brief view of the Annual Report of the Manchester (Eng.) Association for Preventing Steam Boiler Explosions. The information given related to different kinds of boilers—describing their merits and demerits. We will now refer to totally different features of that Report, respecting some of which a great variety of opinion exists among engineers.

High and Low Pressure Steam.—The Report says:—"The economy of high pressure steam is now generally admitted, but there appears to me to be much misapprehension as to the source of this economy. By many it is imagined that it is derived principally from its generation in the boiler. This opinion seems to have been formed from the observed fact, that the pressure increases in a rapidly accelerating progression—in other words, the higher the pressure the more rapid the increase. But it has been satisfactorily proved that the quantity of fuel required to evaporate a given quantity of water increases with the pressure, that is to say, it requires more fuel to evaporate a given weight of water under 60 lbs. than under 10 lbs. pressure, from which we may conclude that no economy will result from the generation of steam at an increased pressure, unless accompanied by a proper use of it in the engine."

[It is true that more heat exists in a given quantity of steam at 60 lbs. pressure than at 10 lbs., but the difference is too little to be of moment, and in general terms it may be assumed that the actual amount of fuel consumed to boil away a given quantity of water will be very nearly the same, whatever the pressure. We propose, at our first leisure, to take up the subject discussed in the following extracts, and present briefly several of our American methods of using steam to much better advantage than it would appear the English manufacturers do.—Ed.]

"Of non-condensing engines little need be said. I will only observe, in reference to these, that in order to work with the greatest economy, it is necessary so to arrange the valves that the steam will be reduced by expansion nearly to atmospheric pressure before escaping from the cylinder.

In condensing engines the steam should be cut off at such a portion of the stroke that at its termination the pressure of the steam will be reduced by expansion to 8 or 10 lbs. below that of the atmosphere, previous to passing into the condenser, otherwise the steam has not done its full work. If, therefore, it be required to expand the steam to this low pressure, say 7 lbs. total pressure, and the valve be arranged to cut off at one-fifth of the stroke, the initial pressure should be 35, or 20 lbs. above that of the atmosphere, and if 10 lbs. additional be allowed in the boiler—which is more than absolutely necessary, we have 30 lbs. per square inch, beyond which there is no advantage in raising the steam for this class of engine, cutting off at one-fifth of the stroke. We find, however, examples where the boiler pressure is nearly double this amount, while the initial pressure in the cylinder does not exceed 12 or 14 lbs. per square inch. This arises partly from the mistaken ideas above mentioned, and partly from errors in the arrangement of the valves. In order to work more expansively and economise fuel, it is usual, where slides valves are employed, to increase the lap or cover of the valve, that it may close earlier, but when this is done it is found that the engine will not drive its load, unless the boiler pressure be increased; the explanation of which is, that the additional lap on the valve has so contracted the opening of the port that the steam can only enter the cylinder at a greatly reduced pressure. By properly proportioning the lap and travel of the valve, the same result might be obtained without any increase of the boiler pressure.

Another error which I must mention is the common practice of cutting out a small piece on the steam side of the valve, in the shape of a V, the professed object of which is to admit the steam more gradually to the cylinder, and thus prevent a sudden shock to the engine in passing the centers. To some extent this effect may be produced, but there will at the same time be the disadvantage of wire-drawing the steam and admitting it to the cylinder when the valve ought to be entirely closed.

A better remedy, unaccompanied by these disadvantages, is the following:—

If the valve of an engine be so arranged as to close the exhaust port before the termination of the stroke, the steam within the cylinder must be compressed as the piston continues its course, and will increase in pressure as the space occupied is diminished. By properly proportioning the degree of compression to the initial pressure on the piston all shock in passing the centers will be obviated, and at the same time steam economized, as in this manner the steam passages and clearance will be filled with steam, which otherwise would have passed into the condenser. This mode of working is certainly contrary to the general practice of engineers, but wherever it has been adopted it has given the most satisfactory results, and I feel persuaded its adoption must eventally become general, as nothing will more effectually prevent those accidents to engines, of which we have so many examples. Within the last twelve months not fewer than fifteen of the engines under our inspection have broken down, which, forming my opinion principally from the indicator diagrams, I have reason to believe would have been obviated by attention to the principle just explained. These remarks on the arrangement of the valves apply equally to engines working compound. This system of working, which has of late been brought much into use, is found in some instances to give very satisfactory results, and where additional power is required, is frequently the most convenient mode of obtaining it, but in comparing the best engines of each system, there does not appear that decided superiority in economy in compound engines which might have been anticipated from the greater pressure of steam. In seeking for the reason of this, we cannot have better evidence than that given by the indicator diagrams, which show that in all engines working compound there is a loss of pressure, as the steam passes from the high to the low pressure cylinder, the amount varying according to the arrangement of the valves and the capacity of the passages of communication.

One example I may mention where the steam, leaving the high pressure cylinder at 53 lbs., is reduced, by expansion in the steam passages, to 11 lbs. pressure before entering the low pressure cylinder. What is chiefly required to improve the condensing engine, and make it equal in economy to the compound engine, is a simple variable expansion motion capable of regulating the supply of steam according to the load, without any reduction in the initial pressure—an evil to which most engines are now subjected by the action of the throttle valve. The present valve motions which have this for their object appear to be too complicated to be brought into general use."

The Transatlantic Telegraph Bill.

Our government extends its aid to the great Telegraph, and secures its share of the benefits thence derivable, by the following Act, which became a law on the 26th of February, Great Britain having already provided for a similar contract:

AN ACT to Expedite Telegraphic Communication for the use of the Government in its foreign intercourse.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of State, in the discretion and under the direction of the President of the United States, may contract with any competent person, persons, or association, for the aid of the United States, by furnishing not exceeding two ships, in laying down a submarine cable, to connect existing telegraphs between the coast of Newfoundland and the coast of Ireland, and for the use of such submarine communication when established by the Government of the United States, on such terms and conditions as shall seem to the President just and reasonable, not exceeding $70,000 per annum, until the net profit of such person, persons, or association shall be equal to a dividend of six per cent. per annum, and then not exceeding $50,000 per annum, for twenty-five years. *Provided*, That the Government of Great Britain shall, before or at the same time, enter into a like contract for those purposes, with the same person, persons, or association, and upon terms of exact equality with those stipulated by the United States. *And provided*, That the tariff of prices for the use of such submarine communication by the public shall be fixed by the Secretary of the Treasury of the United States and the Government of Great Britain, or its authorized agent: *Provided further*, That the United States and the citizens thereof shall enjoy the use of said Submarine Telegraph communication for all time, on the same terms and conditions which shall be stipulated in favor of the Government of Great Britain and the subjects ther eof, recognizing equality of rights among the citizens of the United States in the use of said submarine communication and the lines of telegraph which may, at any time, connect with the same or its terminus upon the coast of Newfoundland and in the United States, in any contract, so to be entered into by such person, persons, or association with that Government; *Provided further*, That the contract to be made by the British Government shall not be different from that already proposed by the Government to the New York, Newfoundland, and London Telegraph Company, except such provisions as may be necessary to secure to each Government the transmission of its own messages by its own agents. *And provided further*, That it shall be in the power of Congress, after ten years, to terminate said contact upon giving one year's notice to the parties to such contract.

Tempering Mill Picks.

Messrs. Editors—I perceive that W. L. Colburn, through the columns of the Scientific American, wishes to find out how to produce a good temper in mill picks. Twenty-one years in the millwright business qualifies me to give the following good recipe:—

To 1 gallon of water add 1 handful of common salt, 4 teaspoonfulls of alum, and 2 of saltpetre. Heat the picks to a cherry red, drop them into this solution, and the tempering is done. G. S.

Tempering Mill Picks.

Messrs. Editors—Having seen a communication calling for information respecting the best manner of hardening mill picks, I thought I would send you my experience in that line of business. My father formerly owned a grist mill, and I will describe the process as he taught it to me. Use the best cast steel; do not heat it above a cherry red for hammering, and in no case must it be welded with borax; the lower the pick is heated the better. Hammer the points till the steel is well settled together and compact, and then file the ends sharp. Put the end of one on the fire, till it acquires a low red heat, when it must be taken out and dipped into water. Go through the same process with the others. After tempering do not anneal them. Picks hardened in this way will stand the best burr mill stones. B. B.

New Russia, N. Y., March, 1857.

[These two methods are not essentially different, and may both be of service, that is, use all the care in working required by B B., and then harden in the water prepared by G. S. The precise nature of the change in the structure of steel in the process of hardening is unknown, but it is induced by the simple process of rapid cooling, however this end may be obtained. It is well known that file makers and others wishing to make steel very hard, prepare their water by some materials or processes which they affect to keep very secret; and all steel-workers are familiar with the fact that salt makes water bite sharper and cools the metal faster—in other words, produces a better hardening medium. It is very possible that the alum-filled pickle is the best fluid in the world for the purpose. The annexed, received after the above was in type, also conveys good suggestions.]

Messrs. Editors—I will give the results of my experience. Blacksmiths generally heat the pick too hot, and harden it too much, and then draw the temper. In this way they generally make it either too hard or too soft. For several years past I have been in the habit of sharpening or tempering for myself. I go upon the principle that the lower the heat is when the pick is hardened in the water, the better, provided it becomes hard enough to stand. After the pick is sharpened, and the edge smoothed off with a file, heat the edge back a quarter of an inch, barely to a cherry red, and then put it into cool water. It will then be ready for use. I think a little experience will enable any mechanic to temper them right, so that they will stand to work on French burr. If they are hardened too far up from the edge they are apt to break or fly off. If they are no harder than common edge-tools they will not do so. Every miller, especially in the country, should have a small forge and bellows. A. G. F.

Quincy, Ill., Feb., 1857.

Cast Iron Sleepers.—Justice.

On page 126, this Vol., we quoted an article from the Lancaster (Pa.) *Express*, in reference to the application made for a patent, about eight years ago, by P. Getz, of that place, for an improvement in cast iron sleepers for railroads. The *Express* published what purported to be the letter of rejection in that case, which letter we copied, and stated that it did not comply with the provisions of the patent law. It was as follows:—

Sir—Your application for Letters Patent for alleged improvements in the chairs, blocks, &c., of railroads, has been examined, and rejected for want of novelty. (Signed)

Edmund Burke,
Mr. Peter Getz. Commissioner.

We have received a letter from Washington in which positive proof is given that the above letter of rejection, published by the *Express*, has done injustice to the Examiner who rejected the application. The following part of the letter after the word *novelty*, was left out:—

"For the cast iron cross tie and chain in one piece, see Tredgold on Railways, plate 2, fig. 7. For the cast-block, with chain attached, cast iron cross-ties, &c., see Repertory of Arts, Vol. 9, plate 16, lines 4, &c. For terms of appeal and withdrawal you are referred to the enclosed circular."

This is from a copy of the rejected letter, and we must say the references are very fair. The *Express* should have published the entire letter.

Position of Posts.

Posts set in earth, particularly in loose sandy soil which allows the air to penetrate, are apt to decay very rapidly. Inverting the position so that the sticks stand 't'other side up with care" has long been known as inducing a considerably increased endurance, and has been often published, but never yet sufficiently introduced into practice. A correspondent of the *Ohio Farmer* gives the following facts in his experience, which may be of value:—

"I put up, in the fall of 1844, some post and board fence. The posts, which were oak, were cut in January, sawed two by three inches at the top, and two by six at the butt. I put them in the ground inverted from the way they grew, and packed with limestone. They are good and sound now. Posts of the same timber, set at the same time, packed with dirt, and without being inverted, are three-fourths rotted and worthless. I am now renewing my fences, with inverted posts, and packing with limestone, at an addional cost of ten cents per panel; and I am sure that in fifteen years the increased cost over the ordinary fence will be saved by this method."

Hard Times.

The peace of the great European nations does not appear to be followed by any increase of prosperity in the industrial interests, but rather the reverse. Much of the work on arms and equipment was, of course, immediately suspended on the confirmation of the peace, and we have already alluded to the fact that the war vessels under construction are temporarily abandoned, and the small vessels afloat are being hauled up, to diminish the expense of sustaining them. Many men are necessarily thrown out of employ, and a meeting of between five and ten thousand of the laboring classes of London was lately held, to consider their distressed condition. It was stated that 25,000 persons engaged in the building trade alone in that city are out of work, and that the total number of unemployed persons in that great metropolis would probably reach a quarter of a million.

The state of things in London must be similar to or perhaps worse than that in this city two winters ago. At present we are happy in being able to say that a very satisfactory state of things obtains in regard to labor. Although the cost of living seems to increase every quarter, business is active, wages good, and all who are willing to work and apply themselves, mind and hands to their business, can secure a good living and accumulate something.

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New Inventions.

Vats for Tanning.

The preservation of skins and the transforming them from gelatinous sheets to the flexible, and peculiarly enduring material known as leather, is an art of great age, and justly ranked among the most important. The process is a chemical one, and, as generally conducted, consists in changing the albumen of the animal substance by the absorption of certain salts or acids, ordinarily termed "tannin." Tannin is produced in solution in the cheapest and most practicable form by steeping astringent vegetable substances in either hot or cold water, and although to facilitate the operation and reduce the expense, when conducted on a large scale, the strength is sometimes extracted from the bark and infused into earth for more convenient shipment—as is the case with *terra japonica*, imported from Australia and other distant points—the process is substantially the same in all cases; the hides and tannin are simply brought together and allowed to produce a mutual action on each other.

While this is true of the general process, the details admit of almost an infinite variety of modifications. The old practice, still scarcely excelled so far as the quality of the leather is concerned, was to spread the hides, pack on all sides with finely broken bark, cover the whole with cold water. and wait patiently several years for the production of leather. In some cases, leather which had been accidently forgotten and allowed to remain some *half a century* too long, has been found rather overdone, and possessing a character somewhat resembling horn, very difficult to soften into a flexible condition even with long soaking; but these are rare instances, for the process is simple and little liable to mistake or failure. But it is far too slow for modern times, and the great hide and leather dealers, whose offices and warehouses crowd that portion of our city known as "The Swamp," and whose tanneries are scattered over the country—located in any regions which are readily accessible and abound in bark—generally count on receiving the leather in tolerable condition in from six to ten months after the raw hides have been started on their journey. But it is only by many and laborious handlings that this is effected—the bark having been first leached with heat, to extract its strength, and the hides turned over and laid down in liquors of various strengths some twenty times.

The devices now to be described are the invention of Elias A. Eliason, a practical tanner of much experience, and have been tested with success on a large scale, in his own establishment. The intent is to diminish the labor and increase the certainty of equally and rapidly tanning all parts of each hide. It is also a means of varying the tanning effect on the flesh and grain sides, tanning either faster or slower than the other, at pleasure. This feature of the improvement being based on the fact that the effect is greatest on the upper side of a skin, and that it is in some degree proportioned to the depth of the stratum of tanning liquor lying immediately over it. The principal features of the apparatus are shown in the accompanying figures.

A frame or false vat is constructed with a series of horizontal ranges of small bars or sticks, upon each of which is placed a hide for the purpose of keeping each separate from the others and in a horizontal plane, so that the liquor may surround each and every hide, and be in constant contact with every part of their surface, in order that the strength of the liquor (which is stirred up when the hides are immersed) may penetrate in nearly equal quantities into each hide.

Figure 1 represents an end view of this apparatus; figure 2 a side elevation of a part on a larger scale, and figure 3 a side elevation of the same.

The false vat or frame, C, is made in a rectangular form, corresponding in size to the vat, G, in which it is to be immersed; into this frame are fixed a series of ranges of small bars, *h*, at regular intervals apart, in horizontal planes, and in such a manner (they being rectangular in their cross section) that each hide, *g*, shall rest on the bars, *h*, as upon knife edges, so as to give free access to the tanning liquor to the greatest extent possible under the circumstances, allowing the liquor to keep in contact with the entire surface of every hide.

The tendency of the tanning liquor being to penetrate more on the upper side of each hide, it is advisable frequently to turn the hides bottom side up; and here the special advantage of this arrangement is made apparent. By inserting a couple of cross bars, one at each end, under the upper rails of the frame, C, and securing to them a couple of hooks attached to the end of ropes wound upon a pair of drums, C. The frame may be raised up out of the vat by turning the large treadwheel, *b*, secured upon the shaft of the drums. Whilst in this position the hides may be examined, and if deemed ready the whole is tilted over together, after simply putting upon the ends of the frame a pair of cross-trees, D, having journals, *d*, upon which are fitted a pair of hooks, F, suspended from the shafts of the drums, as represented. It may then be lowered into the vat by the same means used in raising it, but as it is frequently necessary to transpose the hides from one vat to another, the shafts, *e*, of the drums, *c*, are mounted upon bearings ormed in small carriages, N, by which the whole are moved along upon the ailway, *a*, which runs along theline of the vats, as desired. In this way this hitherto tedious and laborious process can be conducted in as short a time as it would take to remove one or two of the hides. It will readily be seen that the same degrees of tanning can be communicated to both sides of the hide, as the time during which the flesh and grain sides shall each be subjected to the action of the strength of the liquor can be regulated at pleasure. In practice one side of a hide requires to be exposed longer than the other.

IMPROVEMENT IN VATS FOR TANNING.

Fig. 1

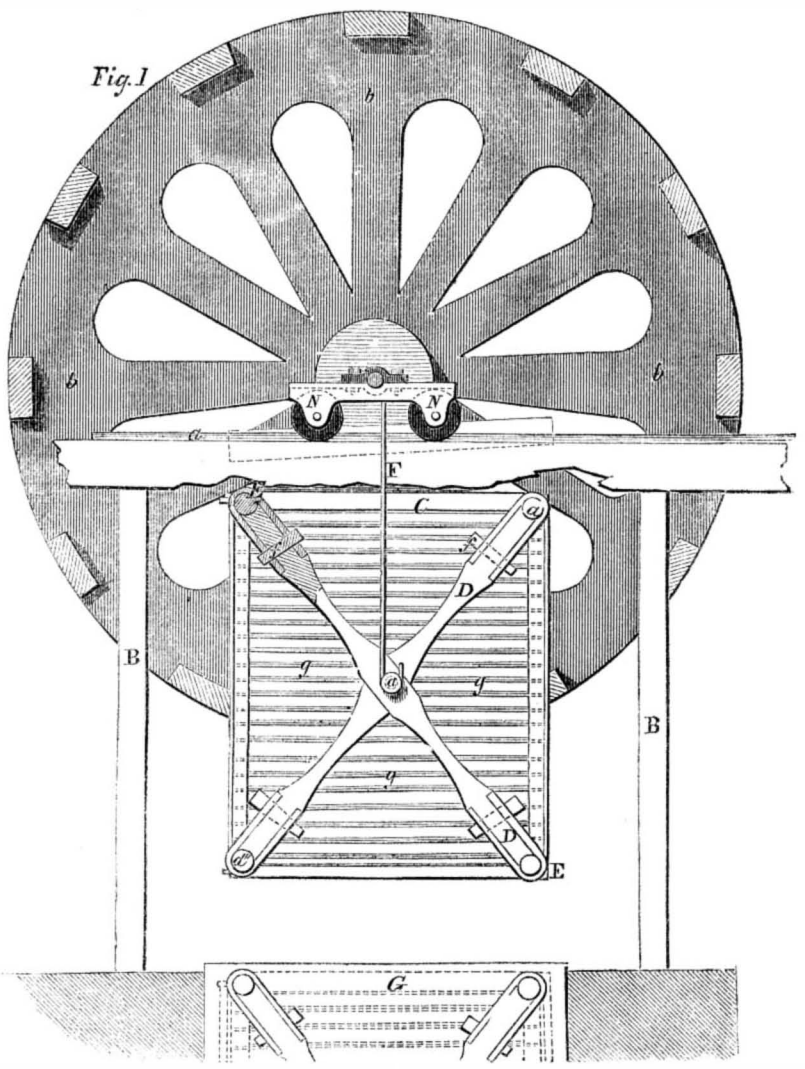
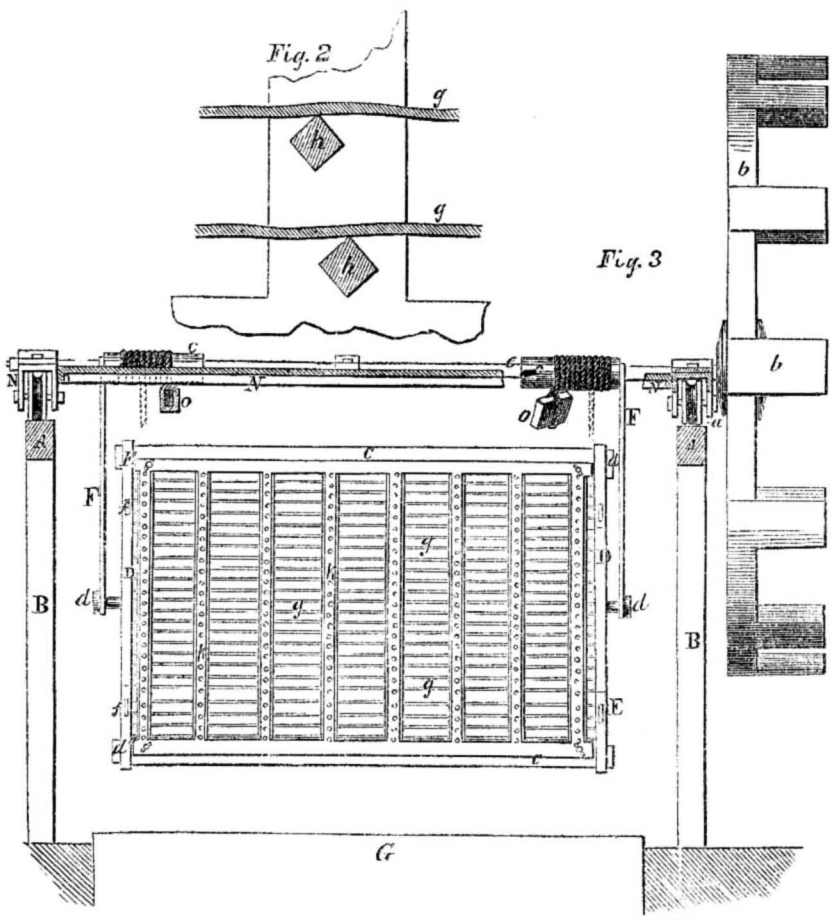


Fig. 2

Fig. 3



In placing the hides in the frame or false vat, C, a false side is first removed, which exposes the ends of the bars upon which the hides rest. These bars are then withdrawn, with the exception of the bottom range, upon which a hide is then placed. Another range of bars is then inserted, and a hide placed upon it, and so on until the whole frame has been filled with hides, taking care to lay the hides all the same side up, after which the false side is again put in its place, so as to prevent the bars from slipping out. It is then ready to be transported and placed in the vat, and so with the removal of the hides from the frame, save that the operation is reversed.

From the foregoing description it will readily be seen that the apparatus possesses numerous advantages over any other now in use, and which will readily suggest themselves to those conversant with the business. The details of the false vat, C, and the means employed for fastening its parts together, etc., may be inferred from the engraving.

The specific gravity of the hides is so nearly that of tanning liquor, that the slats, *h*, can hardly be said either to support the hide or to hold it down, but only to keep it in place, allowing the liquor to touch all points on both its upper and under surfaces. But when hoisted to examine and turn, they serve to drain off the liquor and sediment, and particularly to admit the air in a very superior manner, and to this perhaps may be partly due the superior effect of this mode of treatment. The inventor affirms that leather can be tanned on this principle, in one-third the time usually consumed, making it more solid and firm where the hide is best, and of course much more profitable to the manufacturer. But the greatest point, he continues, "is, that I can make from five to eight pounds more leather to the hides than by the old system, having proved it at different times by marking the weights on each hide separately, tanning twenty-five hides so marked in the frame, and a corresponding number in the old way, with the above results, as the appended certificates will show.

The expense of filling up an old yard, so as to tan from two to three thousand hides is very trifling, perhaps not over $150 at most, and the facts above stated can be tested in one frame, with the fixtures for hoisting, as well as with a number, and at a trifling expense, and making no alterations about the yard.

Applications for rights or for further information may be addressed to the inventor, E. A. Eliason, Georgetown, D. C., to whom a patent was issued on the 7th of October last.

Paying for the Whistle.

One of the Assistant Examiners of the Patent Office being called upon as a witness by the Investigating Committee on Bribery in Congress, states that the clerks were assessed two and a half per cent. to pay an attorney to explain matters to Members of Congress, in order to secure additional compensation, in a bill before the last session of Congress.

The lobbying system in Congress is a disgrace to our country, but Congress itself is responsible for it. The opinion is quite prevalent in the community that Members not only can be approached, but that they court the approach of interested lobbyists—who are mostly ex-Members, and know how "to pull the wires."

Large Plates of Iron.

Some plates for the *Great Eastern* recently rolled at the Parkgate Iron Works, England, exceed, particularly in length, anything in their line. One recently described was 27 feet 3 inches long, 3 feet 3 inches wide, and 1 1-4 inches thick. The weight was over 2 tuns.

The storeship *Supply* has landed another lot of camels in Texas. They are forty-four in number, and were landed in good order during the last month.

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Scientific American.

NEW YORK, MARCH 14, 1857.

Civil Engineering Abroad.

Two Stephensons have already immortalized their names as civil engineers, George, the father of railroads, and one of the first constructors and ablest advocates of locomotives, and Robert, his son, the engineer of some of the mightiest works in Great Britain, and of the Victoria Bridge, two miles long, at Montreal. A third, R. Macdonald Stephenson, has just been knighted for his success in designing and so far carrying forward the great network of railroads now being constructed in India.

We condense the following summary view of the works now going forward from an address given at the annual meeting of the British Institution of Civil Engineers. A system of electric telegraphs had been extended over nearly 4000 miles, through dense jungles, or over the vast plains, rivers and mountains of India. The Indian Peninsular railway had now about 100 miles opened, and various extensions were progressing. The Madras, the Bombay and Baroda, and the Scinde railways, were being vigorously prosecuted, and several other lines were project ed, among which was that from Seleucia, on the Mediterranean, to Jabr Castle, on the Euphrates, which river it was proposed to navigate by means of steam vessels of shallow draught of water. Since the kingdom of Oude had become a part of the British possessions the railway system would be commenced there by the construction of a line of fifty miles in length, whence branches would extend to the most important districts, and be connected with the East Indian railway.

The "Don Pedro the Second" railway, starting from Rio Janeiro, and passing up the Serra into the valley of the Parahiba, and through the principal coffee producing districts, would be about 200 miles in length. The first section of forty miles was commenced in 1855, and would be completed by about the middle of next year. The survey was made amidst a dense primeval forest, and in many places through water five or six feet deep, and great difficulty was encountered in executing the earthworks with slave labor and inadequate tools. By degrees, however, European methods were introduced. English engineers were also constructing important hydraulic works at Rio Janeiro, formed of granite masonry, set in lias mortar, for which the limestone was sent from England.

In Canada, the Grand Trunk Railway might be said to be complete, with the exception of the link to be formed by the Victoria Tubular Bridge across the River St. Lawrence, which was now in progress.

In Europe, gradual extensions of all the main lines were being made. The Lombardo-Venetian system had been transferred to a powerful company. The "Victor Emmanuel" line was approaching the chain of the Alps, for the traversing of which preparations were being made, and experiments upon the machinery for the work of tunnelling on a large scale were being tried.

In Turkey, and in Russia, extensive projects both for railways and steam navigation were being agitated; whilst in Egypt, H. H., the energetic Said Pacha, was completing the railway communication between Cairo and Suez, spanning the Nile by a vast iron bridge at Kaffre Azzayat, and had confided to Mougel Bey the construction of the preliminary works for the canal across the Isthmus of Suez, whilst he had authorized the establishment upon the Nile and the Mahmoudich Canal of a complete system of steam-towing vessels and barges.

It is worthy of remark to how great an extent English engineering skill seems to be employed in all these wide sundered points. Members of the Institution of Civil Engineers seem to figure in some capacity in all these situations, and although something must be allowed for the effort at congratulation naturally to be expected in such an address, it is evident that this bringing of minds together in such institutions is productive of much benefit. Can we not have such associations in some form in this country?

Inventions Wanted.

Some of the best wheat lands in Maryland and Virginia are extremely flat, and from the extreme fineness of division of its particles require a number of drains called water furrows, which are made by the plow in finishing each bed or ridge. But one objection to this mode of doing the work is that it makes and leaves a shoulder, or abrupt furrow slice lying on the edge of the bed throughout its whole length, sometimes almost perpendicular, and often overhanging the water furrow more or less, and constantly falling back into it by its own weight, or washed in by rains, or heaved in by frost.

Assuming that the labor of "striking back," or drawing away this toppling furrow slice to a proper grade with the hoe, is too great, the Southern *Planter* inquires for a plan for doing it by horse power.

"Suppose the water furrow shall be left by the plow eight or ten inches deep by twenty inches wide at top, could not an implement with two mold-boards, perhaps with an extra wing on each mold-board, and the whole adjustable to greater or less width of furrow, be contrived to do the work? The mold-boards and wings, if they are attached, should be sloped on the under side, from the bottom of the furrow to only enough width at the ends to give them strength so as to grade the dirt by wasting it gradually on the bed. The distance from tip to tip should not be less than two feet on each side of the bed."

Rewards for such an implement have been offered by agricultural societies, and individuals have added to the same, so that, although the whole sum, some $80, is too trifling to be any inducement, it serves to show that a want is really felt.

Breaking of the Dover Submarine Telegraph Cable.

We paid no attention to the following when we first found it in a corner of an obscure Canadian paper, but finding it now in the London *Artizan* for February, credited to the London *Times*, we give it for what it is worth, whether a hoax or not. There are three submarine cables from England to the Continent, as indicated by our map on another page:—

"An accident happened to the submarine line across the Channel, and telegraphic communication with the Continent was temporarily delayed in consequence. During the fearful gales on the 5th inst. a ship of 700 tuns, very heavily laden, lost her anchor in the Downs, and, driven by the force of the gale and tide, fouled a schooner, and then, becoming more unmanagable, drifted into five fathoms of water. An anchor was speedily let go, with forty fathoms of chain attached; but the barque, still impelled by the unusual force of the gale, dragged her anchor until she was brought up sharply, head to wind, on opening the western light of the South Foreland. It is found that she here came upon the Submarine Company's Ostend cable. The hurricane, the tide, the weight of the ship, and the necessity of keeping her foretopsail aback to drift into deep water, worked so much upon the submarine line, that, after holding her for some length of time, the cable giving way, she instantly swung round before the wind, and was careering forward with increased velocity, when she was suddenly brought up, head to wind again, by the Calais cable. The barque was held, in spite of the heavy sea, the gale, and the pressure of the wind on her sails, for about an hour, when once more she broke away, and sailed off down the Channel. Both submarine lines, unfortunately, became unworkable in consequence of this untoward accident, and communication with the Continent was partially stopped. The sea at the point where the vessel caught the cables is about fourteen fathoms deep only, and the spot is within three-quarters of a mile from the shore. The Company have already made arrangements to repair the cables the moment the weather will permit. Meantime messages are being telegraphed to Dover, sent thence by the steamer, which leaves thrice daily, to Calais, and are from Calais telegraphed to their various destinations. It is supposed that, the weather proving favorable, both cables might be completely repaired in the course of a day."

Patent Suit—Charge of False Pretences.

A case of some interest relating to the transfer of patent property was tried week before last in Rochester, this State. R. N. Robbins purchased of J. Gorton a patent right on credit, giving as security a mortgage which proved to be worthless, for which transaction Robbins was subsequently indicted for the crime of false pretences. The case was tried in the Court of Sessions before Judge Munger. As reported in the Rochester *Advertiser*, the three principal points necessary for the Court and jury to pass upon were, first, the guilty knowledge, or the *scienter*, as the lawyers term it, on the part of Robbins; second, the value of the property parted with by Gorton, and third, the nature of the instrument he signed when he parted with his interest in the patent right. On the second point there arose a question which, we believe, has never before been discussed under our present statute of false pretences, viz.: whether an invention proved to be impracticable, is a "valuable thing," under the statute, which reads as follows:—"Any person who shall obtain any money, personal property, or *valuable thing*," &c. Upon this point the defence contended that "the value of a patent right does not consist in the paper upon which the government contract is expressed; nor in the benefit that *ma* be derived from the protection it affords; neither does it consist in the assurance it gives that an exclusive monopoly may be enjoyed; but the value of every patent right depends, as far as the owner is concerned, upon the profit derived from the sale of the article it assumes to protect. A patent right is not worth the paper upon which it is written, unless the owner or community can derive some benefit from it."

The main point upon which the whole case turned in a strictly legal sense was, that the instruments signed by Gorton was *in praesenti*. In other words, the writing was in the nature of a quit-claim deed, and did not convey only the interest of the party signing it; therefore, as he had only parted with his interest, and had made no covenant upon which he could be sued, it was reasonable to suppose that the signing of the instrument could work no injury to him, which it was necessary that it should do, (following the decisions under the statute,) in order to hold the party charged with false pretences. However had the prosecution proved an ownership, which they failed to do, in the patent right which Gorton assigned, then the case should have been different.

The jury, after being out about eight hours, came into Court and stated that they could not agree, and were discharged by the Court. They stood ten for acquittal and two for conviction.

Great National Trial of Agricultural Machinery.

The Committee of the United States Agricultural Society, appointed at the fifth annual meeting, held at the Smithsonian Institution, Washington, D. C., on the 14th of January, 1857, "to designate the time and places, and to make all the necessary arrangements for a national trial in the field of agricultural implements and machinery," respectfully invite the inventors and manufacturers of all such articles, both in the United States and foreign countries, to participate in a public trial, to be made at Louisville, Ky., under the auspices of the society, during the fall of 1857.

A separate trial of reapers and mowers will be made at the appropriate season, special arrangements for which, as to time, place, &c., will be announced at an early date.

All articles from foreign countries, intended for exhibition, may be consigned to the "Agent of the United States Agricultural Society, Louisville, Ky.," by whom they will be received and stored free of charge.

This brief announcement of the proposed trial is made at this early date, to afford the most ample time for the preparation and transmission of machinery. A circular, containing full particulars as to regulations, premiums, &c., will be issued as soon as prepared by the committee, and will be forwarded to persons who may apply to the Secretary, Henry S. Olcott, American Institute, New York.

Relief Pictures.

On the 20th of January last, J. Bishop Hall, of this city, obtained a patent for a peculiar method of treating pictures to produce a high degree of artistic and stereoscopic effect of objects, applicable to photographs, engravings, lithographs, and similar pictures. The principle of the invention consists in combining two or more photographic or other prints to form one picture. The pictures must be fac-similes or duplicate impressions, on semi-transparent material. If the invention is to be applied to photographs, let two copies be taken in the usual way, upon photographic paper. The paper of the two pictures is then rendered somewhat transparent by the application of oil to it. Each picture is then to be cemented to a separate plate of glass by means of copal or other suitable transparent varnish, which must be previously applied to the glass, and partially dried—attained to the state called *tacky*. In applying the picture to the glass, care must be taken to press out all the air bubbles between the paper and glass. Each picture is then allowed to become dry, or nearly so, when it will be well to scrape off the back carefully to remove any excrescences. After this is accomplished, one or more coats of copal or other suitable varnish is applied to the pictures; when these are dry, the two plates of glass are joined together in such a manner that the lines of the pictures coincide, in which position they are cemented or framed together, and excluded from the atmosphere.

This is a description of the invention in its simplest form. Different effects may be produced when the front picture only is executed or attached to the plate of glass, and the second one placed some distance behind it so as to correspond with the other. Fine effects are produced by cutting out certain parts of the back picture, thus allowing more light to pass to the front one. Colors may be applied to the back picture only or partially to the two, so that one color on the front picture may have a ground of another color. A back-ground of white light, or reflecting material, placed behind the pictures, such as enamelled white paper or a plate of enamelled white china, produces good effects. The back-ground may also be silvered over to produce effects according to the taste of the operator. The idea of thus combining two or more pictures, printed on paper, or taken by photography—to make them appear like solid pictures, is certainly an ingenious and quite artistic invention.

Pictures produced according to this process are called *Hallotypes*. They have an appearance something like wax figures, but on the whole are artistic and beautiful. A number of them are on exhibition at Gurney's daguerreotype rooms, Broadway, in this city. The back-ground of them is dark, and the figures are colored, and in our opinion they produce a very fine effect.

Stirling Toughened Iron.

In the foreign prices current of metals the above words are frequently found, and it may be interesting to many to learn the character of the material. Morries Stirling is the inventor of a process substantially of dissolving wrought iron particles in cast iron, the result being a fusible metal sensibly stronger and tougher than ordinary cast iron. It had been supposed impossible until demonstrated by this gentleman, that iron once puddled or otherwise made malleable iron, could again be melted and poured, but it has since been done by many for various purposes. Mr Edward Lyon, an ingenious foundryman of this city, melts fine turnings, filings, and chippings of all kinds of iron indiscriminately by a peculiar arrangement of the materials in the furnace so as not to choke the draught, and when the quantity of wrought iron among the same is not excessive produces therefrom a very tough and tolerably ready flowing metal. It is not generally known that such fine particles are available, and they are frequently thrown away or what is pretty nearly equivalent, mixed with earth, to form a kind of cement for hardening roadways and dams.

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Foreign Inventions and Scientific Notes.

A patent has been issued to C. G. Preler, of London, for unhairing and preparing hides for tanning by the employment of fatty or greasy substances in combination with lime and soda, or other alkali, for the purpose of unhairing skins; also for the employment of fatty or greasy substances in combination with soda or other alkali, and the usual materials containing tannic acid (such as oak bark, mimosa bark, terra japonica, cutch, divi divi, sumach, &c.) for the purpose of tanning. Warm water is employed for making the solutions and extracts of these materials, and the skins are agitated while immersed in the liquid, either in cylinders with projections or pegs on their inner surface, and kept rotating; or in open vessels or pits, or by manual labor, or by any other suitable means. For the purpose of preparing the skins, oil or other fatty substances is added to a solution of lime and water; and for tanning the patentee uses extracts of the materials containing tannic acid, made with warm water, and carbonates of soda and oil, or grease.

The Manchester papers give the result of some experiments with the method of smoke consumption, patented by Mr. Woodcock, of London. The steam in the boiler was allowed to subside considerably below the ordinary pressure, in order that the fires might be supplied with coal more freely, and also to show whether, and in what proportion, an increase of steam could be generated. When the steam was reduced to 30 lbs. pressure, coals were applied liberally, and in seven minutes the steam gauge indicated 35 lbs., the smoke during this period being simply of a vaporous transparent character. There were two 60-horse boilers in use, each having two flues and furnaces. The usual plan was to coal the furnaces under each boiler alternately, but in this instance it was done simultaneously, yet the smoke was so trivial that the observers expressed themselves fully satisfied with the result. In the second trial the steam was raised to a high pressure more rapidly, the smoke still being suppressed. The plan has been tried for several months in connection with one of the boilers, and with such satisfaction that two others have now been similarly treated.

The method consists in the admission of heated air, to promote combustion, at a point where an inverted bridge forces the unconsumed smoke down upon the red fire. The smoke is thus brought into contact with the fire, and supplied with the requisite amount of oxygen—in a heated state—to facilitate its combustion. The precise arrangement varies with the length of the boiler and other circumstances, sometimes an extra inverted bridge—iron plate affixed to the top of the flue—being attached. The heated air is introduced through a sort of hollow bridge, the front of which is of brick, and the back of perforated plate iron. The supply reaches it either under the furnace, in the ordinary way, or through a tube on either side of the furnace. Sawdust and other materials were thrown upon the furnace, and dense smoke produced, but it was so effectually consumed behind the perforated bridge that the top of the chimney scarcely indicated the existence of a fire.

C. M'Clean, C. E., in order to encourage the staff employed by him, as lessee of the South Staffordshire, (Eng.,) railway, to insure their lives in cases of accident, for weekly allowances in case of injuries, and for allowances for medical expenses, has undertaken himself to pay one-half of the premiums required by the insurance company. Other employers similarly circumstanced might well follow Mr. M'Clean's example.

E. Talbott, of Spring Vale, Eng., has invented some improvements in rails, which consist in a peculiar construction of split or compound rails, enabling him to manufacture half or split bars with perfect bearings or flanges, and which, when combined, have the required strength and structure of ordinary rails. The compound rails are somewhat similar to two bars of T-iron, placed side by side in reversed position, and may be bolted at suitable intervals along their sides for security, and they may be connected by fish-joints or otherwise.

The French engineers who were sent some time since to Upper Arragon, to examine the question of carrying a railway across the Pyrenees, to effect a communication between France and Spain, have terminated their surveys, and the result has been arrived at, that the line should start from Tarbes and end at the city of Huesca, passing by the bridge of Gavarni. In the neighborhood of Huesca, not fewer than 3,000 men are employed in the preliminary works. It appears, from the surveys, that the passage across the Pyrenees is not so difficult as was believed. The great drawback to the uninterrupted working of the line will arise, it is thought, from the great quantity of snow which is to be found in these districts during four months of the year.

Layard's (the traveler's) project for 350 miles of railway, to commence at Rustchuk or Silistria, and pass by Shumla and Adrianople to Suez, or some other approximate point in the Archipelago, is proceeding satisfactorily. His railway project, connecting the Danube with the Archipelago, has passed all the series of councils, has the consent of the Grand Vizers, and the charter, which is already drawn up, has only to be signed by the Sultan.

The Italian correspondent of the Newark *Daily Advertiser*, an enterprising individual, by the way, who has been the means of publishing several previous discoveries of varying degrees of merit, claims for one M. Colleagues the honors of inventing a little steel ear-trumpet, which reports to the practiced ear the organic action and actual condition of the entire body at any given moment—gauges its vital force, its age, health, and temperature, and indicates the course and event of diseases, &c. It is claimed to be the result of a series of experiments in auscultation which led to the discovery that all vital organization gives out an audible sound—a low hum, accompanied by very distinct crepitation or crackling. These sounds may be discerned, we are told, by an acute ear, but more distinctly with the aid of a steel or cork conductor; and they are said to vary in a measurable manner with the age, temperament, health, and seasons, to indicate the difference between the effects of fatigue and disease, apparent and real death, &c. In complete paralysis, epilepsy, and the like, they entirely disappear, though they continue for ten or fifteen minutes after the cessation of pulsation and respiration in death. They are also heard in amputated limbs for some minutes after the operation—as some creatures appear to be alive after losing their heads. "The humming (*bourdonnement*) appears in every part of the body to which the instrument may be applied, but the crepitation only at the extremities of the fingers and toes, when one of them is placed in its level. I am not aware that any theory has been deducted from these singular results of this new course of physiological inquiry."

Iron and Earth Walls for Buildings.

The great fault with iron, and that which has prevented the adoption of this material still more rapidly for building purposes, is its too ready transmission of heat, making iron buildings insufferably hot on summer days and intensely cold when the sun leaves them in winter. An exchange describes the new Marine Hospital at New Orleans as being constructed on a plan which bids fair to obviate this difficulty:—

"One of our Washington correspondents, in alluding to the contract just executed by the Secretary of the Treasury with Vancluse & Co., for the erection of the new "pise" iron Marine Hospital at New Orleans, states the following interesting fact in connection with the proposed edifice:—It is believed that this building will combine several essential improvements, necessitated by the peculiarities of the soil and climate of New Orleans. While it will probably be the lightest architectural structure, in proportion to its dimensions, to be found on the delta of the Mississippi or the Gulf of Mexico, it will be equally as substantial, and more comfortable for a domestic habitation than many others with double the thickness of the exterior walls. It will probably be the only completely fire-proof specimen of architecture, so far as the external walls and floors are concerned, ever erected on the continent. These results are attained by constructing the external walls of iron columns and veneering, insulated by non-conductors, with a filling in of common earth or pise from nine to twelve inches deep. By this simple arrangement, the inconveniences and dangers resulting from the great conducting and expansive qualities of iron are completely obviated. The conduction of heat from the surface of the external plates through the columns to the interior of the building is intercepted at all the points of contact by non-conductors, and thus discharging from the plates into the atmosphere instead of penetrating the interior of the building. The fact intended to be demonstrated in the construction of this building is that iron can be combined with a cheap non-conducting material for filling in, so as to make the structure of the walls of a building with greater economy, strength, durability, and capacity of resistance of heat, cold, and moisture than can be attained by the use of any other material. A cheap non-conducting material for filling in is indispensable to render the iron cheaper than the brick structure, for the iron plates may be attached to the brick walls as well as to the iron columns. It is clear, therefore, that the simple and inexpensive preparation of common clay, water, and straw, to be found everywhere, known to civil engineers as pise, is the only material suitable for the purpose sufficiently cheap to be used with advantage for the filling in of the iron building."

Deep Sea Soundings.

An apparently well-informed correspondent of the New York *Tribune*, writing on the relative claims of Lieutenants Maury, Strain, and Berryman to the discovery of the telegraphic plateau, forcibly remarks that deep sea soundings have, up to the present time, been of about as much interest to us as the distance of the moon or the density of Saturn. But with the soundings on this route is connected the question whether we will get our European news "with the sun lagging half a day behind," for on the accuracy of these deep sea soundings, he adds, depends the feasibility of the European Telegraph.

The steamer *Arctic*, placed at the service of the telegraph company during this last season, sailed from here July 18, under command of Lieut. Berryman for St. Johns, Newfoundland, from which point to Valentia in the southwest of Ireland, two lines of soundings were made, on the outward and return voyage.—This vessel was furnished with a steam-reel, a most material point, and every appliance which modern science has yet devised for fathoming the depth of the ocean, and each sounding was made under the care of Lieut. Strain, so well known to the world of science by his Darien expedition.

Massy's patent log, attached to the sounding line in nearly every instance, has been in use as a ship's log for several years. Its principle has been long known, it being a mechanical contrivance for registering its own progress through the water. To the lead is attached, upon the principle of the screw propeller, a small piece of clock-work, for registering the number of revolutions made by the little screw during the descent, and it having been ascertained by experiment in shoal water that the apparatus in descending would cause the propeller to make one revolution for every fathom of perpendicular descent, hands provided with the power of self-registration were attached to a dial, and the instrument was complete. It worked beautifully in shoal depths, but was always previously objectionable in deep water, from the difficulty in hauling it up. A 150-pound weight sinks this little self-registering machine to the bottom, Brooks' patent relieves it of the weight, and a steam reel brings it to the surface. With a simple line and shot, one sees miles and miles of his line running away, indicating an almost bottomless sea. The shock of the ball striking bottom cannot be conveyed through two or three miles of line, while long after the sinker has reached its destination, the line is still carried out by the currents and counter-currents that intervene. The line thus forms an immense curve, or perhaps a series of curves, according as there are one or more currents that affect it. The force of these currents will break any but the strongest line. Now, under these circumstances, to give the length of the line paid out as the depth is folly, while all calculations for drifting, &c., are more or less guess work.

On board the *Arctic* both systems were in use, the line out being always a check on the depth indicated by Massy's instrument. All soundings made with Massy's patent agree exactly, and it is only when resort is had to the small line and shot that discrepancies discover themselves, which can be reasonably charged on these inevitable defects of this method just described.

There appears to be, in many, a strong feeling of jealously and dislike of Lieutenant Maury, with which, of course, we have nothing to do. But we hope, though not over sanguinely, for the success of the telegraph project, and cannot see how the soundings are to affect it materially. It is claimed by the parties engineering the enterprise that the pressure of the water has no effect other than somewhat to consolidate the material of the cable, and if this be so, it is idle to dispute about the depths. At the depth of 2,072 fathoms, the pressure of the water is about 6,000 lbs. on each square inch. If half this is not sufficient to compel the water to penetrate the pores of the gum and destroy the insulation, we see no reason to suppose a greater pressure will very seriously affect it.

Sounds Produced in all Living Tissues.

Our knowledge of physiology is progressing very rapidly. It is but little more than a hundred years since Harvey discovered the circulation of the blood, and overthrew the abominably crude notions previously entertained. The arteries are always found emptied of blood in dissections, except in case of death by lightning, as the powerful action of the heart and of the vessels themselves tends to this result; but the ancients had always taught that these passages were made to convey air only, or a certain imaginable fluid corresponding to the spirit. Discoveries have followed each other rapidly since the foundation was laid, and now, by the aid of chemistry, man has attained to a very tolerable degree of knowledge of himself.

Prof. Matteuci—we think that is the name, but the paragraph is not at hand at this moment—has recently announced the discovery that animal muscles actually burn and disappear while working—a fact long suspected and theoretically acknowledged. The animal organization is analogous to a steam engine, the food being the fuel and the lungs the furnace in which the oxygen of the air is united with carbon, producing carbonic acid to be expelled, like the same material from a chimney. This is known to be the source of animal heat, and of all the dynamic power or working energy of the animal organization; but it had not been previously proved that each individual part, each limb, for example, lost a portion of its substance with each muscular movement it performed, and that in proportion as each part, or the whole muscular system is worked, the particles become worn out, or burned, and are removed, to be replaced, of course, by others, and in greater abundance and vigor, in case the exercise has been just sufficient for health, and the stomach and accompanying organs are in good condition, and supplied with material. We have not learned that Prof. M., who is represented to be a foreign *savan* of some note, has yet proved that the nervous matter of the brain is consumed in the same manner by head work, but infer that this is presumed; and as we write this we imagine our brain to be burning up by inches, as well as the muscles of our fingers, but both in a state of healthful action, we hope.

The Adriatic

This splendid steamship has not yet made a trial trip. Workmen are engaged on her constantly, but the valves and valve motions, the parts now at fault, are yet unsuccessful in practice.

Coal and iron of inexhaustible abundance and of several or all varieties of each of the finest quality, are found throughout the whole valley of the Mississippi, from the Allegheny Mountains to the base of the Rocky Mountains.

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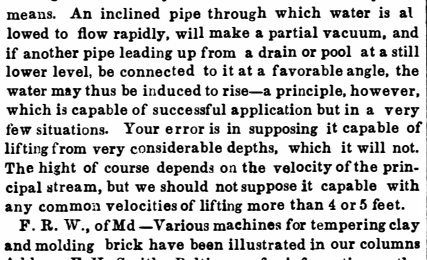

P. S. A., or Ala.—You are right except with regard to the hight to which you can raise the water by that means. An inclined pipe through which water is al lowed to flow rapidly, will make a partial vacuum, and if another pipe leading up from a drain or pool at a still lower level, be connected to it at a favorable angle, the water may thus be induced to rise—a principle, however, which is capable of successful application but in a very few situations. Your error is in supposing it capable of lifting from very considerable depths, which it will not. The hight of course depends on the velocity of the principal stream, but we should not suppose it capable with any common velocities of lifting more than 4 or 5 feet.

F. R. W., of Md.—Various machines for tempering clay and molding brick have been illustrated in our columns Address F. H. Smith, Baltimore, for information on the subject.

D. C. T., of Conn.—Your idea of suspending an ocean telegraph from diving bells moored a few fathoms beneath the water, to avoid the waves at the surface, is more wild and visionary than Prof. Hall's, as it aims to secure none of its advantages. The scheme of Prof. H., f practicable, would afford stations where men might exist and attend to relay instruments, which would give new impulses to the currents in the wire at those points —but yours could not.

C. F. M., of Pa.—Books to aid in constructing steam engines and mill work are very numerous. Robertson Buchanan on "Mill Work" is a good book; John Bourne on the "Steam Engine," is another—both are large books, worth from $6 to $10 apiece; Chas. H. Haswell's "Pocket Companion," price $1.25. is the best in its way of any we know.

J. B., of R. I.—The best work on electricity, and also the best Chemical Dictionary, happen to be one and the same volume, "The Encyclopedia of Chemistry," price about $5; published by H. C. Baird, Philadelphia. We have none of the back numbers you want.

J.C., of Mo.—Three ounces of quicklime nearly slacked, and half an ounce of orpiment powder, mixed well together with water, and formed into a thin paste, makes a good depilatory powder for removing the hair; but all such applications injure the skin.

R. W., of Conn.—The recipes which you have sent are similar to those in Ure's Dictionary.

T. M., of Ct.—The colors on cotton cloth and yarn can be discharged by the common process of bleaching with chlorine and sulphuric acid. The process is carried out fully in all our paper mills.

W. C. G., of T'enn.—We cannot give you the information desired respecting Tyler's and Heller's water wheels —their relative powers, in comparison with an over-shot wheel, under a 25 foot head. The only true method of determining the power of any wheel is by experiment with a friction brake, an operation requiring considerable trouble and expense, but not as much as might be supposed.

S. D. D., of N. Y.—There is no published work in the English language specially devoted to the manufacture of india rubber fabrics.

C. D. G., of Tenn.—Build your steam boiler in with thick brick flues, and erect a high chimney, say 100 feet, and you have less danger of igniting the cotton in your gin house. The employment of wood may compel the use of a spark arrester for safety: use one in the throat of your chimney, where you can reach it by a man-hole. It will injure the draft, but insure greater safety from sparks, and this is what you principally want. The best way to season wagon hubs is to submit them for a few hours to high pressure steam in a close box.

H. C. G., of Phila.—An 18-horse power engine will drive two run of 4 feet stones, but a 21 horse-power engine should be selected, as this is the calculated power which we think is best. You ask whether a motion of 45, 75, or 100 revolutions per minute is the best, and state that engineers with whom you have consulted disagree as to all of these speeds. If you can keep the stones well ventilated, 100 revolutions is the best speed to drive them.—What say our milling correspondents?

J. M. W., of N. Y.—In making hydrogen gas from water, by passing the latter through a red hot retort containing iron scraps, you must not permit any air to enter with the water, because the oxygen will combine with the free hydrogen and form an explosive gas. Use steam in place of water in generating hydrogen gas from red-hot iron, and you will meet with more success.

T. M., of Cal.—We know of no book treating on blacksmithing or forging in any form.

J. McL., of C. W,—Among so many good force pumps we cannot point out any particular one as the best. Search our files and find full descriptions and engravings, and select.

M. M., of N. C.—Reaping machines are too numerous and good to select from without very particular instructions. Write to the proprietors of all those you find noticed in our columns.

J. H. W., of Va.—Mrs. Somerville's Physical Geography is the best that we know of. It was published in London some years ago—has never been republished in this country, we believe, but can be ordered of any respectable bookseller. The æolian harp is constructed by stretching strings at random across a strong beech-wood frame, and placing it in a box or otherwise cased in a window or door, so that a current of air is compelled to pass through it.

D. & B., of Texas.—Sheet zinc is not so good for roofing as tin. It soon wears out by the action of the weather.

J. H. W., of C. W.—We cannot determine the length of pipe employed, how much cold water a coil of a certain number of feet will heat by steam, and in what time. The pressure of steam used must also enter into the calculation. If two feet of 3-inch pipe at 212 deg. will raise a barrel of water to 100 deg. in four hours, 300 feet will, no doubt, raise 150 barrels of water to the same temperature in the same time, if the proportionate quantities of heat are supplied to each.

C. Y. H., of Ohio.—We do not believe that eggs can be preserved in common air-tight cans by simply exhausting the air from them. Try it and report results.

N. & R., of Ind.—We are of opinion that the rag vats and heaters of your paper mill may be heated with the exhaust steam of your high pressure engine.

T. T. E., of Ga.—R. E. Schroeder, Rochester, N. Y makes good carpet fasteners.

A. F. T., of Ky.—Your views and those of Brewster on seeing correct images, although they are inverted on the retina, do not differ. See his article in the last number of the North British Review. A correspondent of ours informs us that images are not inverted on the retina, and he intends, he says, to furnish us with proof to this effect.

J. H. F., of N. Y.—There is nothing new in the arrangement of the engine cylinders as you propose; a double engine has had two cylinders arranged inclined towards each other an an angle of 45 deg. to the horizon, consequently at a right angle to each other, their pistons connecting with the same crank. This form of engine is more than a quarter of a century old. Your proposed mode of preventing vessels from becoming waterlogged has been applied to the construction of life-boats, and the patent law makes no distinction between different kinds of navigable vessels.

R. N., of Vt.—Copal varnish is the best for making labels adhere to tin boxes. Perhaps butter can be separated from milk by some chemical process, but not cheaper than by the simple act of churning. Cheese is one of the constituents of milk, described in number 24, this Vol., Scientific American, to which we refer you for answers to all your questions respecting the composition of milk. Hydrostatic pressure simply means the pressure of water at rest. It ceases to be hydrostatic when it moves machinery—it is then hydraulic.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, March 7, 1857:—

M. J., of Pa., $35; E. E., of N. Y., $29; S. T. S., of Mass., $25; J. T. H., of Pa., $30; M. T. J., of Ohio, $30; W. W. D., of Cal., $100; T. V., of Cal., $25; B. A. H., of N. Y., $25; T. & B., of Mass., $30; W. W., of Wis., $30; W. W. M., of Ill., $30; D. R., of O., $25; D. B., of Iowa, $25; E. L. E., of R. I., $12; E. L. & Co., of S. C., $92; A. R., of Texas, $55; J. C., of ——, $50; D. W. & H. A. L., of N. J., $25; E. P., Jr., of Ct., $25; T. E., of Pa., $55; H. N. DeG., of N. Y., $30; E. M., of N. Y., $30; A N., of Pa., $27; J. G. A., of N. Y., $30; L. W., of N. Y., $30; C. W., of N. J., $30; W. L. B., of Vt., $30; D. R. A., of Ohio, $25; E. C., of O., $36; S. B., of Mo., $90; S. Y. L., of L. I., $30; J. B. W., of N. Y., $250; W. A. F., of Ct., $60; G. V. B., of Mo., $35; N. E. H., of N. Y., $30; C. S. M., of N. Y., $30; J. H., Jr., & Co., of N, Y., $100; J. B., of N. Y., $55; S. H., of Pa., $55; S. S. C., of N. H., $25; T. B. DeF., of Ct. $60.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, March 7, 1857:

S. S. C., of N. H.; J. C. K., of N. J.; E. E., of N. Y.; S. T. S., of Mass.; J. W., of O.; B. A. H., of N. Y.; L. H. A., of Ala.; M. C. R., of O.; S. T. H., of Ill.; J. S., of L. I.; L. W. & H. A. L., of N. J.; J. D., of N. J.; D. B., of Iowa; E. L. E., of R. I.; E. P., Jr., of Conn.; D. R., of Ohio; A. N. of Pa.; C. O. L., of Vt.

Literary Notices.

HOMEOPATHY: ITS NATURE AND PRINCIPLES.—By George Glewitz, M.D., Stratford, Conn.—Few there are who understand the principles on which the medical science denominated "Homeopathy" is based. A pamphlet of fifty pages has been recently written, at the solicitation of some of the author's friends, which explains in a concise manner the principles on which the science of Homeopathy is founded. The writer takes occasion to explain briefly the principles of each variety of medical science, and then in an able manner sets forth the advantages of the homeopathecal system of administering medicines over the allapathic or antipathical methods. The great discoverer or inventor of Homeopathy has lived in the present century, hence the science is comparatively new. Hahnmann was born in 1750, and lived to the age of 88 years. His life was an active one, and many award to him the name of inventor in the same high rank as Benjamin Franklin, Robert Fulton, Prof. Morse, and other inventive stars of the first magnitude. To those who would like to become familiar with the science and principles of Homeopathy, and to learn something of its founder, we would recommend the perusal of this pamphlet. Address Geo. Glewitz, M.D., Stratford, Conn., inclosing ten 3-cent postage stamps.

THE KNICKERBOCKER—This genuine monthly for March is illustrated with a fine steel plate likeness of Fitz Green Halleck. The papers contributed are numerous, able, and interesting. The poetry is unusually excellent, and the Editor's Table, as usual, sparkles with wit and humor. The leading article is a criticism on the poet Shelly. The story of Eleanor Manton is continued, and so are the "Observations of Mace Sloper, Esq." Published by Saml. Hueston, 348 Broadway, this city.

THE EDINBURGH REVIEW—The number for this quarter of the above-named review maintains its old high character for fearless and able criticism. It pays a most noble and high compliment, in the leading article, to our American historians, Prescott and Motley, in a criticism on "Philip the Second and his Times." It contains nine essays—not an indifferent one among the lot. Published by Leonard Scott & Co., 54 Gold st., this city.

THE WESTMINSTER REVIEW—The number for this quarter of this radical reforming review contains eight able original essays, besides remarks on cotemporaneous literature. One of the essays on Boiling Water is an able paper, and we shall shortly present its leading features, with illustrations, to our readers. Published by Leonard Scott & Co., 54 Gold st., this city.

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HOW TO WRITE—A new pocket manual of composition and letter writing. A popular hand-book, embracing hints on penmanship, choice of writing materials, practical rules for literary composition in general, and epistolary and newspaper writing, punctuation and proof-correcting in particular; with letters of business, relationship, friendship, and love, illustrated by numerous examples of genuine epistles, from the pens of the best writers, including forms for letters of introduction, notes, cards, etc., and a collection of poetical quotations. Price in paper, prepaid by mail, 30 cts., muslin, 50 cts. The following, in press, will be issued as soon as possible: "How to Talk," or hints toward a grammatical and graceful style in conversation and debate. 30 cents. "How to Behave," a manual of etiquette and guide to correct personal habits, with rules for debating societies and deliberative assemblies. Price 30 cts., muslin 50 cts. "How to do Business," a guide to success in practical life, and hand-book of legal and commercial forms. Same. $1 will pay for the four works in paper, and $1.75 in muslin. They will be sent to subscribers, postage prepaid, as fast as issued, by FOWLER & WELLS, 308 Broadway, N. Y. 27 2

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G. B. HARTSON, late proprietor of the Globe Iron Works, having retired from that establishment, will now give his personal attention to executing orders on commission, for all kinds of machinery, Steam Engines, Boilers, &c. His long experience as a practical engineer and manufacturer will enable him to give general satisfaction; office, No. 74 Wall st., N. Y. 25 4*

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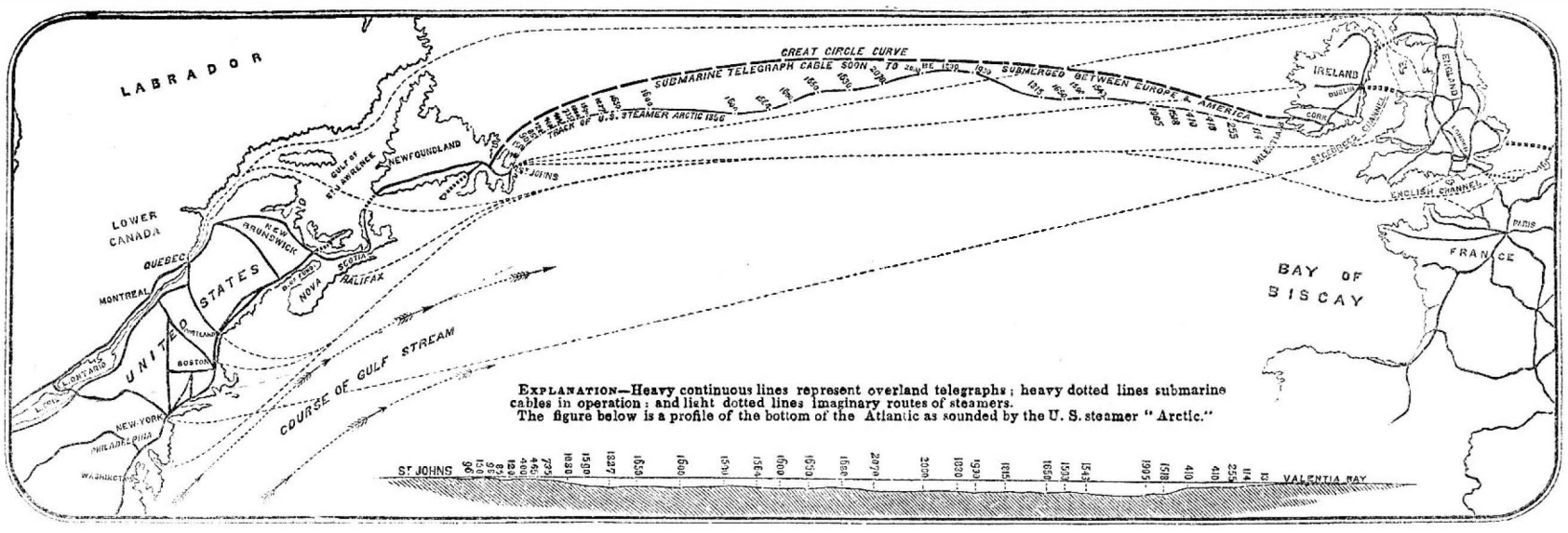
THE ATLANTIC SUBMARINE TELEGRAPH.

The great enterprise of connecting the old and new worlds by telegraph, is one of the greatest interest to all our readers. There have been but two schemes for this purpose of any prominence. One chartered by the Canadian Parliament, in 1854 or '5, proposed to telegraph in short circuits from island to island, by way of Greenland, Iceland, the Shetlands, and the Orkneys, to both the northern coast of Scotland and the western coast of Norway, the cables to be all of the heavy and most approved construction, and the circuits to be nowhere more than about 500 miles in length, so that the communication through each would be quick and certain. Little has been heard of this project since that date, but its rival, proposing to telegraph directly, by a route corresponding very nearly with that of the vessels trading between this port and Great Britain, has been urged vigorously and energetically forward. The American Telegraph Co. have conducted a line overland to the Island of Cape Breton on the east of Nova Scotia, and the New York, Newfoundland and London Telegraph Co. have laid a cable from thence under the Gulf of St. Lawrence to Newfoundland, and established a line along the south shore of that island to St. John's on the extreme eastern boundary, the very outpost of America. The harbor of St. John's has been deepened at its entrance by submarine blasting, conducted by the parties who operated successfully in removing the ledges at Hurl Gate, and has been made capable of affording facilities for the largest steamers, so that in case of failure of the main cable across the broad Atlantic, steamers can make the run and keep up the connection in less time than heretofore. But the most interest concentrates on the great effort—the transatlantic cable, the property of the Atlantic Telegraph Co.—the difficulties pertaining to, and the means adopted or suggested for overcoming which, have already occupied several of our columns.

Contracts have been made with two large manufacturers, Messrs. Kuper, of Greenwich, and Messrs. Newall, of Gateshead, Eng., for the completion, each of equal portions of the cable, on or before the end of May next. A series of observations, continued for many years past, indicate August as the period in

MAP OF THE INTENDED TRACK.



which the weather is usually most propitious, and in that month of the present year two large and powerful steamships, each loaded with half the cable, are to meet at the appointed rendezvous, a certain latitude and longitude in the mid Atlantic—exchange signals and ceremonies, join the ends of their respective cargoes, fire a gun, and steam off in opposite directions each exchanging signals continually through the whole cable with its late companion, until the ends of the magic chain—a slender thread, for most of the route but made stouter when within thirty miles of each shore—are safely stretched up the beach and securely covered protect it from all malicious or mischievous intermeddling.

The distance in the nearest line is 1640 nautical or 1900 statute miles. The depth at the deepest point sounded is 2072 fathoms equal to about two and one-third statute miles. This deep point is within sixteen miles of the middle. The soundings were taken as nearly as practicable at every 20 miles, but, there are several points where a greater distance was omitted, the filling up of which is merely conjectural. The bottom is soft mud composed mainly of very minute shells, similar to such now seen above ground in the form of limestone or chalk formations; and, free from all disturbing influences, the wire will probably sink quietly into its substance several inches, possibly feet, on a good portion of the route.

The cable is necessarily slender, as a heavy one would require more vessels, and thus multiply the chances of failure in laying it. It is to be 2600 statute miles in length and weighs a little less than one tun per mile. Its whole cost is to be £224,000, equal to about $1,084,-160. It contains a single conducting thread, but this (as a safeguard against defects and accident merely) is made in several distinct wires twisted together.

THE GULF OF ST. LAWRENCE CABLE.

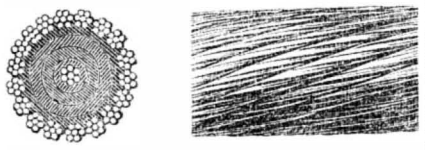
FIGURE 2. FIGURE 3.

Figures 2 and 3 represent the cable leading from the main land to Newfoundland, which is, in size and construction, the nearest analogous to the Atlantic Co.'s cable of any now in use. These cuts were intended to be of exactly the natural size, but are a little too large, the true diameter being very nearly three quarters of an inch.

Figures 4 and 5 represent the line destined to thread the depths of the telegraphic plateau, and is a little larger than the true size. The actual diameter of the cable, except at each end, as before referred to, is about five-eights of an inch, or exactly that of a five-cent piece. The central strand is composed of seven copper wires, No. 22 gauge; this is surrounded by three consecutive layers of the finest gutta percha as the insulating medium. This coating is thus laid to avoid a possibility that air bubbles or other fault may exist at any point, and endanger the insulation of its core; as by this means any imperfection in one coating is overlaid by a sound part in another. A lapping of yarn saturated with a mixture of tar and pitch is then wound around the gutta percha, to serve as a bedding upon which the external protecting wires are placed.

THE GREAT ATLANTIC CABLE.

FIGURE 4. FIGURE 5.



Laying the cable in the deepest water is an operation requiring considerable care. To prevent depositing it too freely in coils and serpent-like convolutions it must be kept strained and only allowed to run as absolutely required; on the other hand, any considerable over-tension would snap it. Should circumstances compel the ship to stop, the weight of some two miles of the cable must be supported, even if it be allowed to run until it hangs perpendicularly, while, if it hangs inclined, this pull may be increased indefinitely. Again, as the ship heaves with the sea, should heavy weather be encountered, each movement tends to jerk on the line, and thus aid in rending it. The most approved machinery will be adopted so as to pay it out to suit all these conditions, and every precaution is being taken to guarantee the greatest possible degree not only of insulating efficiency and strength, but also of flexibility to the cable, the strength being intended only to endure, however, until it is fairly in its place on the bottom. Submarine telegraphs have generally been covered with stout wires galvanized, but the process of galvanizing, although protecting it somewhat from oxydation, also impairs the strength of the metal, and it has been decided to cover the Atlantic cable with fine wires naked. The salt water will rust and destroy the metal, but will leave in its place a coating of oxyd so chemically combined with the mud as to form a thicker and more impervious covering. There are eighteen protecting strands on the outside of the cable, as represented, each composed of seven charcoal annealed iron wires—No. 22 gauge. There are therefore seven miles of copper conducting, and 126 miles of soft iron protecting wire in each mile of the cable, and its flexibility is represented to be such that it may be tied in a knot around a man's arm without injuring it.

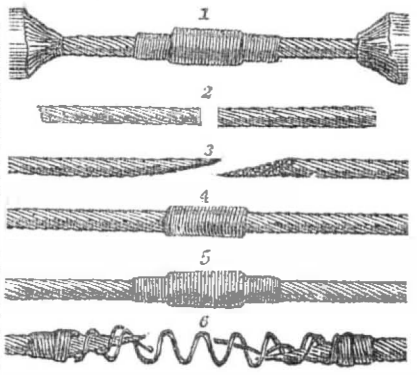
In order to lay it in the manner described, by two vessels, and provide a thicker protection near the shore, the cable must necessarily be made in four pieces, and convenience will probably induce its manufacture in a still greater number of separate sections. The following description of the mode of joining the ends we extract from the London *Engineer* of January 30:—

"The machinery employed to spin the cable consists of a large horizontal wheel, round the circumference of which are arranged a series of bobbins of the iron wire strand which is to constitute the protective armor of the cable. The gutta percha covered copper wire made by Mr. Statham, at the Gutta Percha Works, and subsequently wrapped over with the layer of tarred yarn is passed through the center of the vertical axle of the wheel to which the bobbins of wire strand are attached, and is enveloped by the wheel in revolving with a spiral covering of the outer strands.

The way in which the different lengths of the central conductor are soldered together, when required, is exemplified in the annexed wood-cuts. The two ends to be joined are first divested of the gutta percha covering, for some short distance, the extremities are then, with a file, bevelled off to the same angle, and laid together and soldered. Over the joint so made a coil of copper wire, of the same gauge, No. 22, as the strands, is wound round and soldered to it, through its whole length. Lastly, over this primary coil, there is wound yet another, which overlaps the first coil at the two extremities, where only it is soldered to the central conductor. The object of this arrangement is, that in the event of the joint giving way, the coil last put on, by retaining its hold at the two ends, and extending itself, may still be enabled, as shown in the last figure, to keep up the continuity of the central conductor.

The central conductor being formed of a strand of seven wires in place of a single wire of the same sectional area, if a flaw exist in every one of the seven wires, there is no probability of these all occurring in the whole of the seven wires at the same place; and it is evident that were these seven flaws collected in a single yard of the strand at intervals of a few inches apart from each other, the conducting power of the strand as a whole would not be reduced by more than a seventh."

It is, of course, to be understood that the joint is covered with great care with gutta percha.



If perfectly, or even if but partially successful, the existence of this telegraph will have a very important influence on the business and diplomatic relations of the new and old worlds. The difference in longitude between New York and London is such, that the news from the latter will arrive here some hours *ahead* of time, and although this difference will be against the messages going in the opposite direction, it chances that, in heavy financial operations, our market always takes its cue from the London and Paris prices, and not theirs from ours. The rate of charge for private messages has been fixed at $1 per word—none to be charged for less than twenty words. The arrangement for government service is fully expressed in the law given on another page.

The proprietors of the steamship *Columbia*, not yet finished, have purchased the right to use the Sickles' cut-off, thus seeming to concede the validity of its claim to cover the ground occupied by Allen & Wells' invention, which latter had been previously adopted

The cost of all the railroads in the United States, when those in the process of construction are completed, is estimated at $1,000,-000,000.

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